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An Address.[1]

By A. V. MEEHAN,
Brisbane.

IT is with real pleasure that I address you tonight as your president. My first thought is to congratulate you all on the fact that our association is able to meet again after about four years of enforced hibernation. The fact that a goodly proportion of members have been giving of their best in the service of their country in war since we last met has been a big factor in keeping the association in a state of suspended animation. Those not in the services have been occupied, often to the limit of their endurance, in the unenviable task of carrying on civil practice in war-time. Others have given their time freely as consultants or visiting medical officers in the services. I cannot help thinking how deep should be our gratitude for blessings received, which have allowed us to resume our activity even at this stage.

It is common knowledge that the fate of our country was decided by a mere hair's breadth, and instead of meeting together to pool our knowledge and to try to achieve some good for the maimed and crippled members of our community, we could readily tonight be slaves of an alien race, condemned to sink all our high ambitions and ideals under the heel of our conquerors. I think that I shall be voicing the wishes of our members if I try briefly tonight to take stock of the growth of our speciality in this country, and to consider whether there is anything that we can do to promote progress in our own field of surgery in the future.

In thinking calmly over this subject, we must all realize that orthopædic surgery in Australasia is a mere fledgling among the specialities. We should all still regard ourselves as torch-bearers. Until very close to the end of the last war there was not, to the best of my knowledge, an orthopædic department in any public hospital in Australia. The number of surgeons confining their practice to orthopædic surgery when the last war ended could, I believe, be counted on the fingers of one hand. Crippled children's associations and crippled children's homes were unknown. The conception of the scope of orthopædic surgery amongst the public and even amongst our professional colleagues was hazy and nebulous. A very small band had, towards the end of the war, been given an opportunity to sit at the feet of a great surgeon and teacher in our Mother Country. Robert Jones, in the murky atmosphere of Liverpool, glowed with the pure flame of enthusiasm to heal the lame and the halt. He was a born leader of men and a master surgeon.

At this period no formal course of training in orthopædic surgery was available in the British Empire, and no diploma or degree in our speciality was obtainable. Almost solely through the instrumentality of Robert Jones, orthopædic centres had been established in England under army auspices during the Great War. At the centres in Liverpool (Alder Hey) and in London (Shepherd's Bush), Robert Jones and his assistants trained army surgeons in the principles and practice of orthopædic surgery. Wounded soldiers with conditions requiring special orthopædic skill for their successful treatment were segregated at these centres. Crowds of Americans and a few Australians and New Zealanders were attached to the Royal Army Medical Corps for service at these centres, and were

[1] Presidential address, delivered at the annual meeting of the Australian Orthopædic Association on June 22, 1945, at Sydney.

given an intensive training. Red tape was cut; trained men were urgently required for service in their respective countries, and the stubborn resistance of army convention was overcome by this pressing need. The course of training was eminently practical, and the trainees were given the opportunity of doing actual operative work under skilled supervision. Courses of lectures by disciples of Robert Jones augmented the theoretical work. The Alder Hey trainees were given the facilities to act as honorary demonstrators in the anatomy department at the University of Liverpool and to attend out-patient clinics at civil hospitals. The wonderful spirit of *camaraderie* and good humour which characterized all institutions conceived by Robert Jones made the work congenial. Orthopædic surgery was done, talked of, and dreamed of morning, noon and night; surgical material was in ample supply. These courses of instruction constituted the embryo of the formal course of instruction commenced at Liverpool later and culminating in the establishment of the Liverpool degree of master of orthopædic surgery, which so many members of this association have since gained.

But for the establishment of army orthopædic centres in England during the Great War, the development of the speciality in Australia would have been delayed for years. I have been pained in recent years to encounter young Australian graduates who have never heard of Robert Jones, and it behoves members of this association to keep evergreen the memory of this great pioneer and leader.

Rapidly after the first World War disciples of the great master scattered throughout Australia and were soon able to impress on general surgeons and hospital administrations the importance of their speciality. Thus, briefly, were most of the first orthopædic departments established in our capital cities, and they have come to stay. The speciality has a great attraction for young recruits, and although their training has been seriously held up by the present war, orthopædic surgery is well on its feet in this country, and I have no doubt that many recruits will be available from the ranks of the young surgeons now on active service. It will be our duty to train them, and if we flag and tire we should look back and stimulate ourselves by the thought of all that Robert Jones and his disciples did for us under similar conditions a generation ago.

I had hoped that much more would have been done in the way of training orthopædic surgeons within the army during the course of the present conflict. One factor which has prevented this has been that conditions for training have not been nearly so favourable for Australian surgeons as they were during the first World War. Australians were then in the centre of major activities. Britain, with its teeming population and ample surgical material, was a mere few hours' journey from the country where the major fighting was waged. The Australian army was abroad for the duration of hostilities, and when the war ended facilities were given to those who wished to stay on in England to take various courses of training.

In the present war the Australian army has had a peculiarly unsettled career and has spent most of its time away from Britain—first in the Middle East, then back in Australia and the islands. Then came a long period of speculation as to future moves, and now it is fighting again far from any area offering facilities for surgical training. Surgical personnel at general hospitals have been rapidly changed, and no comprehensive scheme for training future generations of surgeons has materialized. It is easy to criticize, and I doubt whether the peculiar career of the Australian army in this war has made such a scheme practicable up to the present. It may be that we have suffered from lack of an orthopædic leader of the calibre of Robert Jones; but so far as conditions in the Australian army are concerned, I am not sure that even he could have evolved an efficient and lasting scheme of training. Orthopædic units have certainly been established and have done excellent work; but the training they have been asked to do has been severely limited. I feel that something has been lost by the absence of departments of orthopædic surgery based on full-time staffs from all general hospitals in this war. The Americans have adopted this plan, and I have seen it working well in their general hospitals. The inclusion of such units in Australian general hospitals would undoubtedly have led to the acquirement of better orthopædic equipment and helped to obviate the use of makeshifts, which loomed large at least in the early stages of the war. I still hope that better facilities for the training of young army surgeons will be organized. Otherwise there will be a trying time lag when the war is over and these young men can come into action in civil practice.

I have no fear that our speciality will fail to make progress and thrive when something resembling normal civil life is resumed. It will do so by sheer weight of its own merit; it has already proved itself as filling a crying need in the community. However, like every other human activity, it must progress or perish, and its progress depends mostly on the present generation of orthopædic surgeons. We have in Australia no royal road for a young man to tread in order to become a specialist in orthopædics. No organized course has been available up to the present. It is interesting and encouraging to note that the Royal Australasian College of Surgeons now proposes to confer fellowships in orthopædic surgery in addition to those already conferred in the special branches of ophthalmology and oto-rhino-laryngology. This will demand a high standard, including a good knowledge of general surgery and a period of apprenticeship in orthopædic surgery. I greatly welcome this move, and I feel that those gaining this fellowship will, if they choose to confine their activities to orthopædic surgery, be welcomed as members of the Australian Orthopædic Association.

I have no doubt that the members of our association will facilitate the attainment of this hall-mark for aspirants to our speciality by putting their hearts and souls into the training of recruits. Our members are in charge of most of the orthopædic departments in which such training can be given, and our association will grow and prosper like any other family only by breeding likely progeny. If the standard of orthopædic work is kept high, and if our fully fledged orthopædic surgeons do not weaken in the arduous task of training the younger generation, nobody need fear the future of our speciality.

Another thought which has occurred to me often in the past few years has been that we must constantly keep our sense of proportion in the relation of our speciality to other branches of surgery. I have been particularly struck by the rapid strides which two other special branches of surgery have made in these war-time years; I refer to plastic and neurological surgery. To resort to sporting parlance, I feel that we should "team up" with these two specialities more than we have done in the past. If we do so, I have not the slightest doubt that our own strength will be enhanced and, above all, that the patient will greatly benefit. This sense of proportion should be extended also to general surgery, which after all is the basis of all surgery.

There is no doubt that during this war many general surgeons have become expert in dealing with the more serious types of compound fractures; it is only natural that in civil life they will continue to regard some of these cases as part of general surgery. If they are experts there is no reason why they should not be encouraged to do so; we should not claim the whole field of traumatic surgery as our province. When the general surgeon has taken his choice of cases in this particular field, there will still be ample work for us.

There is a common anomaly in the public hospital work of the orthopædic surgeon which I should like to commend to your consideration. It is unusual for an orthopædic surgeon to have charge of children and adults alike in his department. Often he has to see the children under his care pass from his surveillance when they reach a certain age. I feel that this is a serious disadvantage both to patient and to surgeon; continuity of treatment, provided only that it is good treatment, has immense advantages in orthopædic surgery. The constitution of our hospitals is such that most frequently the management

and staffing of adult hospitals are entirely separate from those of children's institutions. An orthopædist with only an adult hospital appointment misses an immense amount of what I like to call pure orthopædics—the treatment of congenital deformities and, above all, the prevention of the development of deformities in adult life. Similarly, the surgeon who holds only a children's hospital appointment is deprived of a large field in traumatic surgery. As one who holds an appointment where he can follow his patients from infancy to adulthood if need be, I want to impress on you the wonderful mental satisfaction which such a happy position carries with it. It is not by any means easy to achieve such a state of affairs. I would urge all members of this association to use all the energy at their disposal to bring about this continuity of treatment in their practices.

Another factor without which I regard an orthopædic practice as being incomplete is access for the surgeon to a crippled children's home. Such institutions broaden the orthopædic surgeon's conception of his life's work. He supervises the rehabilitation of the crippled child and learns to regard his patient, not as a piece of deficient material which has to be mended, but as a growing human being with a mind and a soul as well as a body. Any operative procedure which he is called upon to perform falls into its proper niche as a mere step on the road of his duty to help the crippled child to grow from strength to strength in his rehabilitation, until he fills his adult lot in life by the full development of the physical and mental powers with which Nature has endowed him. Could any factor sweeten labour more than the adoption of this role in the training of the cripple, rather than the mere fulfilment of the function of an occasional carpenter called in for a short session of physical work on the unconscious patient?

BLOOD GROUPS IN THE MAORI.

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BEFORE the advent of the Europeans, New Zealand was inhabited by a numerically strong race, the members of which compared favourably with any people in the world in both physical appearance and mental capacity. This race, the Maori, is generally considered to be derived from intermixture of several distinct waves of Polynesian canoe voyagers. Of the early peoples, the descendants of Toi-kai-raku who immigrated to the North Island about 1150 A.D. are probably the most important. The Society Islands are now believed to be the earliest main Polynesian centre from which other islands of Polynesia were colonized, and it was from there that the last extensive migration came via Raratonga some time about the middle of the fourteenth century. Indications are that the navigational skill of the migrants was such that their safe arrival on the North Island of New Zealand after crossing thousands of miles of ocean was no fortunate landfall, but was the result of careful planning based on previous purposeful exploration.

There are two main theories as to the route by which the Polynesians came into the Pacific from Indonesia, probably under pressure from the Malay invasion of the East Indies. The first route which suggests itself geographically is via Melanesia, along the northern coast of New Guinea and thence via New Britain, Bougainville, the Solomons, the New Hebrides and Fiji to Samoa and Tonga and thence further east. Though this route involves only relatively easy sailing stages, its use has been largely discounted by the lack of signs of racial admixture with the Oceanic Negroes who are usually assumed to have been earlier arrivals in Melanesia.

According to Weckler (1943):

> The only alternative route by which the Polynesians could have bridged the distance between Indonesia and their historic home is via Micronesia. If this was their course, the early navigators probably steered into the open Pacific through the gaps between Mindanao, the southernmost Philippine Island, Celebes and the Moluccas. They then presumably proceeded through the small scattered islands of the Palau group, Yap, and the Carolines. From the eastern Carolines some explorers may have headed north-east through the Marshalls and from there made the long landless passage direct to Hawaii. Most canoes, however, probably worked south-east through the Gilberts and then perhaps split courses again, some making their first Polynesian landfall in Samao via the Ellice Islands, perhaps stopping off for a time in Fiji; others perhaps steering east, from the Gilberts through the Phœnix atolls, passing north of Samoa and sailing on to their first Polynesian home in Tahiti and the Society Islands.

Evidence of racial admixture in favour of one or other of these theories should remain in the blood grouping picture of the Polynesian of today. The Melanesian is practically untouched by the Mongoloid (Malay) migratory waves which have exerted considerable influence on the Micronesian. The frequencies of the A, B, O blood groups in both Micronesia and Melanesia differ greatly from those in Polynesia, with the exception of Samoa, where trade with Fiji has been going on for centuries. (There are many affinities between Fiji and Samoa.)

So far the published blood group figures have thrown little light on the probable route of the Polynesians to the Pacific.

Data for the frequencies of the blood groups, the subgroups of A, the MN types and the Rh factor, have been published for Papuans (Graydon and Simmons, 1945) and for Fijians (Simmons, Graydon and Barnes, 1945); but to date only the A, B, O blood groups have been determined for any Micronesian population or for the Maoris of New Zealand, and it was thought that determination of the more recently discovered blood factors might provide evidence in favour of one or the other of the theories of the migration routes of the Polynesian.

In this paper is reported the result of the determination of the A_1–A_2, B, O, M, N, and Rh factors in blood samples collected from 267 pure-blooded Maoris living on the North Island of New Zealand. No attempt was made to classify the Maoris into their Rh subtypes because at the time of testing (March, 1944) no suitable sera were available, and little was then known of the various Rh subtypes. It is hoped that analysis of the Rh factor in this interesting race will be completed on a new series of blood samples collected at some future date.

The only previous blood grouping survey of the Maoris of which we have knowledge is that of Phillips (1931), in which the outstanding findings were the almost complete absence of the B factor and the exceptionally high percentage of blood samples of group AB in his series obtained from the Arawa tribe. This unexpected finding was of particular interest, and we were naturally anxious to have the Arawa tribe well represented in the present survey.

Material and Methods.

The blood samples were obtained from selected pure-blooded Maoris at North Auckland, in the Rotorua area, and at Gisborne where a Maori gathering was in progress. The 275 samples, each consisting of two drops of blood taken into one millilitre of glucose-citrate blood-preserving solution containing 0·001% "Merthiolate" (Simmons and Graydon, 1945), were placed in ice-packed "Thermos" flasks and transported to our laboratory in Melbourne by motor car, aeroplane and rail. On inspection, prior to being tested, eight of the samples were found to be partially hæmolysed and were rejected. The remaining 267 samples were tested on the day of their arrival at Melbourne, which varied from three to seven days after collection.

Preliminary tests with known cells and other large-scale surveys had shown that the grouping sera and the M, N testing fluids used in this series were highly potent and specific. The Rh factor was determined by use of a potent human anti-Rh serum "Mrs. C.", which is now known to be a standard anti-Rh° serum. The slide technique with adequate controls, as previously described (Simmons *et alii*, 1941, 1943), was used throughout.

Results.

In presenting our results we have subdivided the data into three groups according to tribe and district, group I being the Arawa tribe from the Rotorua area, group II being composed of the Ngapuhi (86) and Ngatua (3) tribes located in North Auckland Province, and group III, a miscellaneous collection representing 29 tribes all residing in the area bounded by Hawke's Bay, East Cape, the Bay of Plenty and the centre of the North Island.

The South Island and the districts along the west coast of the North Island to the north of Wellington were not represented in this series.

The most striking feature of the results of the blood grouping tests shown in Table IA is the almost complete absence of the group B factor, which is in agreement with the finding reported by Phillips (*loco citato*) of the rarity of this factor in the Maori. The two samples of group B in the present series were from a girl, aged twelve years, and a youth, aged nineteen years, of the Ngapuhi tribe. These young Maoris showed no evidence of white admixture.

Amongst the 84 samples from the Arawa tribe we failed to find one belonging to group AB, which contrasts sharply with the 24 samples (19%) of this group reported by Phillips for the same tribe.

The frequencies of groups A and O in the Arawa in both this survey and that of Phillips (Table IB) are approximately equal; but in the East Cape-Hawke's Bay district the frequency of group A is exceptionally high, being double that of group O, while in the south-west of the North Island Phillips found group O to have almost double the frequency of group A.

All of the 155 samples belonging to group A were of sub-group A_1; this compares with a similar finding by Nigg (1930) for the only other Polynesian race yet tested, the Hawaiians.

In Table II are shown the M, N results subdivided similarly to the ABO figures of Table I.

The *m* and *n* genes occurred with approximately equal frequency: $m = 0{\cdot}489$, $n = 0{\cdot}511$.

The 267 samples tested were found to be Rh-positive, all being agglutinated by a standard anti-Rh° serum.

Discussion.

The low incidence of the B factor which has been found in some Polynesian islands is generally attributed to undetected hybridization with the white or yellow races. However, it could also be an example of the concluding stages in the gradual elimination of a gene, originally of low frequency, by random matings within a small population during a long period of isolation. The trace of group B has been found in areas of Polynesia as widely separated as Easter Island, New Zealand and Hawaii, and this fact may support the latter theory, although these islands have been settled by other than Polynesians for a long period.

The peculiar finding of 24 group AB samples in the Arawa tribe by Phillips and our failure to find one representative of this group require some elucidation. Phillips advanced two alternative explanations. The first assumed a new agglutinin-agglutinogen system or factor which was present in the blood of the Maoriris who were in possession of the land prior to the Maori migrations. The Maoris fought against and drove the remnants of the Maoriris from the more fertile areas into the Uriwera mountainous region. Later, considerable Maori-Maoriri admixture occurred, and the Maoriris disappeared as a race. The

TABLE IA.

Blood Group Frequencies in Maoris.

Tribe.	Locality.	Number Tested.	Number and Percentage of Groups.				Frequency of Genes.			D/σ
			O	A	B	AB	*p*	*q*	*r*	
Arawa	Rotorua	84	43 51·2%	41 48·8%	— —	— —	0·285	—	0·715	—
Ngapuhi, 86 (+Ngatua, 3)	North Auckland Province	89	36 40·4%	51 57·3%	2 2·3%	—	0·347	0·011	0·636	1·0
Miscellaneous, 29 tribes	Bay of Plenty, East Cape, Gisborne, Hawke Bay and Central North Island	94	31 33·0%	63 67·0%	—	—	0·426	—	0·574	—
Total	North Island	267	110 41·2%	155 58·1%	2 0·7%	—	0·352	0·004	0·642	0·9

TABLE IB.

Blood Group Frequencies in Maoris found by Phillips (1931).[1]

Tribe.	Locality.	Number Tested.	Number and Percentage of Groups.				Frequency of Genes.			D/σ
			O	A	B	AB	*p*	*q*	*r*	
Arawa	Rotorua	127	49 47·5%	53 51·5%	1 1·0%	24 —	0·303	0·005	0·690	—
Miscellaneous	South-west of North Island and 2 of South Island	73	46 63·0%	26 35·6%	1 1·4%	—	0·198	0·007	0·794	—
Total	.. ..	200	95 54·0%	79 44·9%	2 1·1%	—	0·258	0·006	0·735	—

[1] In the calculation of the percentages and the gene frequencies, the 24 group AB samples have been omitted.

TABLE II.

M, N Frequencies in Maoris.

Tribe.	Locality.	Tested. Number	Number and Percentage of Types.			Frequency of Genes.		D/σ
			M	MN	N	*m*	*n*	
Arawa	Rotorua	84	25 29·8%	42 50·0%	17 20·2%	0·548	0·452	0·05
Ngapuhi, 86 (+Ngatua, 3)	North Auckland Province ..	89	20 22·5%	47 52·8%	22 24·7%	0·489	0·511	0·5
Miscellaneous, 29 tribes	Bay of Plenty to Hawke Bay Area	94	20 21·3%	42 44·7%	32 34·0%	0·436	0·564	0·9
Total	North Island	267	65 24·3%	131 49·1%	71 26·6%	0·489	0·511	0·3

occurrence of this new factor in the Arawa was due to the proximity of the Uriwera Mountains to Rotorua. This explanation appears to us most unlikely. Included in our miscellaneous group, in which we found no group AB samples, were many individuals from districts in and around the Uriwera Mountains.

Phillips's alternative suggestion was that the specimens contained a non-specific agglutinogen capable of reacting with the agglutinin of group A serum. It seems more likely that the non-specific agglutinogen present in the 24 samples classed as belonging to group AB reacted with the specimens of both A and B serum used, and was probably induced by bacterial contamination of the specimens of cells (Hübener-Thomson phenomenon—Wiener, 1939). We encountered a similar phenomenon in blood samples taken from Australian aborigines on Groote Eylandt (Wilson *et alii*, 1944), and subsequent tests have shown that the cells may be affected without evidence of hæmolysis or discoloration.

Although the series are small, there is a definite suggestion in the available figures for Maoris of a gradient for *p*, the gene for the blood group A factor. The highest value of *p* (0·426) is found in the East Cape-Hawke's Bay area, and a secondary high value exists in the North Auckland Province. The value of *p* then falls as one goes south through Rotorua to the most southerly portion of the North Island (Phillips's miscellaneous group). No data are available for the South Island, where the scanty Maori population is thoroughly dispersed.

The frequencies of the A_1–A_2, B, and O factors in the Maoris and Hawaiians are strikingly similar and agree well with the theory of their common origin, possibly in the Society Islands. The absence of the subgroup A_2 in the Maori serves to emphasize further how restricted is the distribution of this group among the races of the world. It is found in about 10% of members of the white races and the American Negroes, in about 2% of Asiatic Indians, and in from 1% to a very small number of Japanese, Chinese, Eskimos and Filipinos. It has been shown to be absent from the blood of Australian aborigines, Fijians, Indonesians, Papuans, Hawaiians, Maoris and American Indians. It seems likely that this factor may become increasingly important to anthropology as more extensive figures are reported. For example, it does not seem possible that a race such as that of the Maori in which the subgroup factor A_2 has not been found, can be closely related to the European races with which it is usually grouped under the classification "Mediterranean".

The M, N distribution in the Maoris is in marked contrast to that in Australian aborigines, in Papuans and in Fijians. No figures for any other Polynesians are available; but if the Maori data can be taken as being typical of Polynesia, the distribution fits in admirably with the theory of a north-south gradient of *m*, advanced by Birdsell and Boyd (1940). In the so-called "peripheral" races—those which have been driven furthest from their original homeland in Asia—there exists today evidence that at one time Eastern Asia was inhabited by races from which the B factor and the subgroup A_2 factor were absent. At this period the M, N distribution was in the form of a north-south gradient, the highest *m* value being to the north and the lowest to the south. Later migration waves forced out the earlier inhabitants more or less radially—the Eskimos to the north, the American Indians also to the north via Behring Straits and Alaska and thence to the south and east over North America, the Polynesians via Indonesia to the Pacific and the Australian aborigines via Indonesia to Australia. Of these, the first to leave Asia were probably the Australian aborigines. The Melanesians and Papuans presumably left Asia after the arrival of the B factor, and according to this theory, they probably came from an area where the *m* gene was scarce.

The M, N distribution in Fiji would be expected, on geographical and historical grounds, to be intermediate between that found in Polynesia and that found in New Guinea, and this is in agreement with our M, N figures for the Maoris. Thus, the frequency of *m* found in the Papuan is 0·19, in the Fijian 0·33 and in the Maori 0·49.

The theory that the Polynesians entered the Pacific via the Melanesian route gains no support from the blood-grouping data. As this route involves only easy sailing via the north coast of New Guinea and thence by a chain of fertile islands already inhabited by the Melanesian Negro type, one would expect to find evidence of racial intermixture. The trace of B found in the Polynesian could have been so derived; but it could have come equally well from admixture with the Micronesian races. Also, the frequency of *m* would be expected to be low if there had been appreciable Melanesian admixture; but the Polynesian (Maori) has a frequency of *m* differing greatly from that found in the Papuan. Unfortunately, the complete lack of M, N, A_1–A_2 and Rh data for Micronesian races renders it impossible to compare them with the Polynesian in respect of these factors.

It is hoped that the blood-grouping work in this most interesting part of the world, containing as it does so many different racial types which still retain their ancient sociology, will be rapidly extended in new areas, and as many as possible of the more recently discovered blood factors investigated.

Summary.

1. Blood samples, obtained from 267 Maoris living in the North Island of New Zealand, have been examined for the A_1, A_2, B, O, M, N, and Rh factors.

2. The group percentages were as follows: group O, 41·2%; group A, 58·1%; group B, 0·7%; group AB, 0%. The rarity of the B factor is in agreement with the findings of others for the Maoris (Phillips, *loco citato*) and for other Polynesian races.

3. In contrast to the report of Phillips, no group AB samples were found among those collected from 84 members of the Te Arawa tribe.

4. All the 155 samples possessing the A factor were found to belong to subgroup A_1.

5. The type percentages were: type M, 24·3%; type MN, 49·1%; type N, 26·6%.
6. All the samples were Rh-positive.
7. Some anthropological aspects of these results are discussed.

Acknowledgements.

It is a pleasure to record our gratitude to Dr. F. G. Morgan, Director of the Commonwealth Serum Laboratories, Melbourne, for his interest and valuable encouragement in this work, and to Dr. W. Gilmour, Director of the Pathological Department, Auckland Hospital, through whose kind offices this investigation was made possible.

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THE FIFTIETH ANNIVERSARY OF THE DISCOVERY OF X RAYS.

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THIS year we commemorate not only the fiftieth anniversary of the discovery of X rays by Röntgen, but also the hundredth anniversary of his birth. Until a few weeks ago it could be claimed that no single scientific discovery had so rapidly impressed the whole world or had given rise to such widespread and immediate applications. To appreciate fully the significance of this discovery, it is necessary to recollect something of the developments leading up to it.

The seventeenth century saw the development of the vacuum pump by Torricelli, by Guerricke and by Boyle. Using the electrostatic machines developed by Guerricke and by Newton, Gray and others early in the eighteenth century distinguished between conductors and non-conductors of electricity, while Hawksbee observed the glow discharge of gases under reduced pressure. The anomalous electrical behaviour of gases at varying pressures (the property of a good insulator at atmospheric pressure to change to a conductor at low pressures) engaged the attention of many investigators. Both Morgan, about 1780, and Plucker, about 1850, report having observed a curious fluorescence on the glass near one electrode of a discharge tube; but the observations were not followed up in any detail. The discovery of electromagnetic induction by Faraday in 1835 led almost immediately to the development of the induction coil, which could be operated from the primary cells of Volta, while by 1860 Wimshurst had developed an improved electrostatic machine. With these comparatively powerful sources of high tension at their disposal, Geissler, Hittorf and Crookes from 1860 to 1880 developed vacuum discharge tubes and investigated the luminous discharge. Lenard, in 1892, produced cathode rays and studied their properties outside the tube, while J. J. Thomson in the next year described in considerable detail the passage of electricity through gases. By 1895 there was scarcely a university or large school throughout the world which did not include in its teaching some demonstrations with Crookes and Hittorf and Lenard tubes.

With this general background, it is interesting to recall Röntgen's personal record at this time.

Wilhelm Conrad Röntgen was born on March 27, 1845, in the small town of Lennep, in the Rhineland. His father, a cloth manufacturer, whose family had lived in Lennep for generations, had married a cousin, a Dutchwoman, with family connexions in the town. Röntgen was an only child. When he was three years of age, the family moved to Apeldoorn, in Holland, his father renouncing his Prussian citizenship. Röntgen's early education was at a

Wilhelm Conrad Röntgen, 1845-1923.

Dutch boarding school. Expelled because he refused to name a fellow student who was the author of a schoolboy prank against a master, he was unable to complete the normal continental *Gymnasium* curriculum and so enter a university. Instead, he attended the Technical College at Utrecht and later the Polytechnical School at Zürich, where he took his diploma of mechanical engineering in 1868. Transferring his attention to physics, he studied under Kundt (successor to Clausius), took his degree of doctor of philosophy, and became assistant to his professor. In 1871 he accompanied Kundt to Würzburg, where, however, his lack of proper academic credentials precluded him from a university post. Following Kundt again to Strassburg, he obtained his first official university appointment in 1874. Next year he was appointed professor of physics and mathematics at the Agricultural Academy of Hohenheim, but soon returned to Strassburg. In 1879 he was appointed professor of physics at Giessen on the recommendations of the leading German physicists of the day. In 1886 he declined the chair at Jena, and in 1888 he declined that at Utrecht, but in the same year he succeeded Kohlrausch at Würzburg. He was now head of the department in a university which seventeen years before had not permitted him an official post. In 1894 he became rector of the university.

In 1872, Röntgen married the daughter of a political refugee from Germany with whom he had become friendly in Zürich. Having no children, they adopted an orphan niece.

By 1895, Röntgen had worked successfully in many branches of physics. He had published more than fifty papers covering a considerable range of subjects, including the ratio of the specific heats of gases, the conduction of heat through crystals, the discharge of electricity through

insulators, studies in elasticity and capillarity, the rotation of the plane of polarization in gases, the pyro-electrical and piezo-electrical phenomena in crystals, the absorption of heat in water vapour, the viscosity and compressibility of liquids and solids, and the magnetic effects produced in a dielectric when moved in an electric field. (The last-mentioned experiments led directly to the theories of Lorentz and helped in the foundation of the electro-magnetic theory.)

In these papers Röntgen had shown that he was an experimental physicist in the truest sense of the word. While many experimentalists occupy themselves almost exclusively with one problem and attempt to obtain a higher accuracy by a continuous perfection of technique, Röntgen preferred to explore many physical phenomena. It is, therefore, not surprising to find that at this time he took up the study of cathode rays.

And so we come to the evening of Friday, November 8, 1895. It was Röntgen's custom when beginning new investigations to repeat the important experiments of other workers, and for several weeks he had been repeating the experiments of Lenard, who had observed the fluorescence produced in a coating of crystals of barium platinum cyanide on cardboard by the cathode rays transmitted by a thin window. On this occasion he had wrapped a Hittorf tube completely in black paper, and while working in a darkened room he noticed that the screen which was lying on a table near by fluoresced when the tube was being excited. Now such a screen was known to fluoresce under the influence of ultra-violet light from the sun, or from a discharge tube, or from an electric arc. Röntgen found, however, that the fluorescence persisted when the screen had been completely shielded from such sources. Further, if the effect was due to cathode rays, then these could travel through glass and had a path in air much greater than had been found by Lenard.

Röntgen then began some weeks of feverish investigation. To his family circle he merely said that he had discovered something interesting, but he did not know whether or not his observations were correct. He made no other announcement, not even to his technical assistants, until on December 28 he handed to the president of the Physico-Medical Society of Würzburg his preliminary report on the discovery. This was immediately printed separately as a monograph, although the paper was not read before the society until January 23, 1896.

Röntgen's first communication is a remarkable example of scientific writing. Only an experienced scientist with great keenness of observation and thoroughness of critical judgement combined with brilliant experimental skill could have elaborated, without assistance and within seven weeks, from the simple reaction observed on the fluorescent screen, an explanation in such a brief form. He begins immediately:[1]

1. If the discharge of a fairly large induction-coil be made to pass through a Hittorf vacuum-tube, or through a Lenard tube, a Crookes' tube, or other similar apparatus, which has been sufficiently exhausted, the tube being covered with thin, black cardboard which fits it with tolerable closeness, and if the whole apparatus be placed in a completely darkened room, there is observed at each discharge a bright illumination of a paper screen covered with barium platinocyanide, placed in the vicinity of the induction-coil, the fluorescence thus produced being entirely independent of the fact whether the coated or the plain surface is turned towards the discharge-tube. This fluorescence is visible even when the paper screen is at a distance of two metres from the main apparatus.

It is easy to prove that the cause of the fluorescence proceeds from the discharge-apparatus, and not from any other point in the conducting circuit.

Röntgen then proceeds to record his observations of the phenomenon. These are summarized below.

2. All bodies are transparent to this agent (or these rays), though in different degrees. (For brevity's sake Röntgen used the expression "X rays" to distinguish these new rays from other known rays. He had investigated the transparency of a large number of materials—solids, liquids and gases, metals and salts.)

3. The transparency of different substances of equal thickness is essentially conditioned by their densities, but this is not the only cause acting.

4. All substances become less transparent with increase in thickness. (Röntgen had used photographic plates to determine the relation between transparency and thickness, but had no suitable photometer available to make accurate measurements.)

5. The transparency of lighter metals is much greater than would be expected from the product of thickness by density. (Röntgen had rolled sheets of platinum, lead, zinc and aluminium to have the same transparency.)

6. Many materials fluoresce under X rays. (Röntgen considered that the photographic action was due to fluorescent light produced in glass and gelatine. Films and papers were used as well as plates. He had not demonstrated any heating effect, but felt that there must be some transformation of energy in the material passed through. Röntgen found that the eye was not sensitive to X rays.)

7. Refraction could not be detected even by means of prisms and lenses of many materials.

8. Reflection could not be detected; but bodies behave towards X rays as turbid media do towards light. (Röntgen had obviously observed the scattering of X rays.)

9. No difference in the transparency of crystals with direction could be detected.

10. Intensities of X rays are governed by the inverse square law. (Röntgen had shown that X rays are much more penetrating than cathode rays.)

11. X rays are not deflected in a magnetic field.

12. X rays radiate from that spot on the wall of the discharge tube which fluoresces most strongly and are produced by the cathode rays at the glass wall.

13. X rays are produced when cathode rays strike materials other than glass.

14. The name ray is given because radiation is propagated rectilinearly as shown both by shadows and by pin-hole photographs. (Röntgen specifically mentions having obtained X ray photographs of the lead oxide in the panelling of an ordinary door, of a coil of wire wound on a wooden bobbin, of a set of brass weights in a wooden box, of a compass contained in a metal box, of a piece of non-homogeneous metal, and of the shadows of the bones in his wife's hand. Illustrations of the four last-mentioned photographs appeared in his paper, but it was the last which attracted the most attention.)

15. Experiments to detect interference phenomena have given negative results.

16. Experiments to detect electrostatic deflection of X rays have not yet been completed.

17. The nature of X rays is most probably a longitudinal vibration in the ether. (Röntgen was led to this erroneous conclusion because he believed that all transverse vibrations should have been reflected, refracted and diffracted, and his experiments in these directions had produced negative results.)

Röntgen's second communication followed on March 9, 1896; it is actually a continuation of the first, and can be taken with it.

Röntgen had early discovered that electrified bodies near an X ray tube were discharged; but in order to exclude completely the effects of Lenard rays, or of the electrostatic fields proceeding from the vacuum tube and high tension equipment, he delayed publication of this property until he could carry out further conclusive experiments. This he did by building a chamber of zinc plates soldered together, faced on the side next to the tube with sheet lead. A small window in the chamber was made air-tight with a thin sheet of aluminium, and this admitted a beam of X rays. Any effects within the chamber were therefore due to X rays alone. Within this chamber Röntgen set up his measuring instruments and made his observations.

[1] The translation of the original paper and some of the biographical details have been taken from "Wilhelm Conrad Röntgen", by O. Glasser (Bale, Sons and Danielsson, London, 1933).

18. X rays can discharge electrified bodies. (Röntgen had observed that air through which X rays had passed could discharge electrified bodies with which it came in contact. Hydrogen acted similarly, but more slowly. The discharge in a vacuum was very slow.)

19. X rays are much more intense when a condenser is placed in parallel with the tube.

20. The most efficient tube so far constructed is one with a concave aluminium cathode, having as anode a platinum plate placed at the centre of curvature of the cathode and at an angle of 45° to its axis.

It must be admitted that in those few weeks Röntgen had gained a considerable knowledge of the properties of X rays.

It is amazing to find how rapidly the news of the discovery was disseminated throughout the world. The original paper was distributed early in January, 1896, and was published immediately in English, American, French, Italian and Russian scientific journals. Advance copies of the paper, together with copies of the original X-ray photographs, had been sent by Röntgen to friends in Germany, Austria and England. The radiographs sent to Warburg in Berlin were exhibited at the fiftieth anniversary of the Berlin Physical Society on January 4, 1896, but passed practically unnoticed. On the same day, the radiographs sent to Exner in Vienna came to the notice of the editor of *Die Presse*; he, appreciating the sensational news value, published a full account the next day. Through the news cable agencies, reports appeared immediately in newspapers in capital cities throughout the world. It was undoubtedly the radiograph of the bones in the hand and the practical possibilities of X rays in medicine that captured popular imagination.

It has been explained earlier that most universities and even large schools were equipped with induction coils or Wimshurst machines and with some form of discharge tube. The newspaper reports contained sufficient information regarding the essential fluorescence of the glass walls of the tube to make it possible for any worker quickly to select the necessary degree of vacuum for the production of X rays. Consequently, in many places X rays were produced and radiographs were taken within twenty-four hours of the publication of the newspaper reports, and even before copies of Röntgen's original paper became available.

There followed feverish activity everywhere as Röntgen's experiments were repeated and new ones undertaken. The results of these were published by the general scientific and medical journals almost simultaneously. *Nature* announced the discovery on January 16, and in the next week's issue reports followed from English workers as to the most efficient method of obtaining radiographs, with examples. For several months each issue contained a résumé of the latest developments in X-ray research. Many of these commenced with the words: "During the last week so many papers have been published that only the more important can be mentioned here." Both the *British Medical Journal* and *The Lancet* described the discovery on January 11. In both cases the discovery was headed "The New Photography", and indeed this title was used in medical journals for many months. The *British Medical Journal* engaged a special commissioner to report new developments in X-ray research and provided equipment with which any interesting medical case could be examined. His regular reports ran up to Number 17.

By March, Röntgen's first paper was in its sixth edition, and translations had appeared in English, French, Italian and Russian. Since readers of scientific journals had easy access to the paper, it can be assumed that there had been an appreciable public demand for copies.

It would be impossible to review all the papers which appeared on the subject of X rays during that first year. At least 50 books and pamphlets and over 1,000 individual papers in scientific journals were published during 1896. It is exceedingly difficult to assign any priority to many of the discoveries which were made, since many workers reported their investigations almost simultaneously. In fact, one German scientist complained bitterly that although X rays were discovered in Germany, the elucidation of the nature of the rays and the investigation of many of their properties were reported much earlier by English and French workers in journals with weekly issues than was possible in Germany, even though German workers had made similar if not speedier progress. The chemist Ramsay even went so far as to suggest that it would be scientific etiquette that all communications on a new scientific subject should be submitted to the discoverer before publication so that he could guard his rights to priority.

There were a number of claims made for the discovery of X rays prior to Röntgen. It is certain that Morgan, about 1780, and Plucker, about 1850, had produced X rays (because they describe the characteristic fluorescence of the glass in a discharge tube), and no doubt many others had also done so. Crookes, in 1879, had used a cathode ray tube with a concave cathode and a platinum anode, and recorded that photographic plates stored near by were fogged. He did not, however, connect this fogging with the discharge tube, and on one occasion returned the plates to the manufacturer as unsatisfactory. Many others produced shadow pictures, taken in some cases prior to 1895, which they claimed were due to X rays. Undoubtedly some of these were; but the effects had been confused with those of light leakage. During 1896 many workers produced outline shadow pictures using electric sparks in air, an electric-light globe with a broken filament, an electric field between plates, the light from burning magnesium, and even prolonged exposure to intense sunlight. In most of these cases the shadows were undoubtedly caused by the penetration of light through incompletely opaque wrappings; but each new claim brought forward collected its band of enthusiastic followers.

A glance through the newspapers and magazines of the period indicates that the new discovery everywhere captured popular imagination in an amazing manner. Photographers sold prints of radiographs of the hand in the same way as seaside shops sell local postcards; for a special fee one could even have radiographs of one's own hand taken to send to one's friends. The serious journals all carried descriptive articles on the new rays and their properties. Literary and other societies had lunch and evening lectures on the subject, while all the humorous journals made frequent reference to the new radiations and their many possibilities. Editors of newspapers received letters signed by "*Pro Bono Publico*" and others protesting that this latest discovery of rays capable of passing through closed doors and shuttered windows was an assault on privacy and a menace to the often-claimed right that "an Englishman's home is his castle". An American lady temperance lecturer welcomed the discovery of X rays, because, as she said, if her audiences could only see with their own eyes the damage caused to their interiors by alcohol and tobacco her cause would be won. In the House of Assembly of one American State, a bill was introduced prohibiting the use of X rays in music halls. The well-known inventor, Edison, received a pair of opera glasses with the lenses removed and was asked "to fit them with X-ray lenses". One enterprising advertiser in a London newspaper offered, from an accommodation address, to forward under plain cover one pair of X-ray spectacles for £3, extra strong for £5. During February, both London and New York drapers were advertising, at special prices, underwear opaque to X rays. Suppliers of scientific equipment made a special feature of X-ray equipment for professionals or amateurs. English manufacturers, for £8 10s., supplied complete X-ray units, comprising an induction coil giving a three-inch spark, a battery, an X-ray tube, and a fluorescent screen six inches square. These found a ready market, not only among medical men and professional photographers, but among amateur scientists and those desiring a new parlour game.

By June, however, *Nature* reported that "the novelty of X-ray skeletal photographs has almost worn off and the field of research is now mainly occupied by scientific workers, who are endeavouring to analyse the rays and extend the knowledge of their characteristics rather than to produce startling pictures capable of exciting the wonder of the general public".

It is not now necessary to discuss the subsequent discoveries of the properties and nature of X rays; it is indeed possible only to mention briefly some of the direct results of the discovery of X rays and some of their applications.

The discovery of X rays led immediately to profound advances in other branches of physics. Becquerel, seizing on the fact that certain minerals fluoresced under the action of X rays, began investigations on minerals which fluoresced naturally, and by March had published papers showing that uranium minerals emitted some form of radiation resembling X rays. Radiographs of metal objects made by means of uranium minerals were obtained in Cambridge before the end of the same month. And so, arising directly from the announcement of X rays, followed the immediate discovery of radioactivity and a year or two later the discovery of radium.

The ionizing action of X rays was observed by J. J. Thomson in February, before the publication of Röntgen's second paper, and by utilizing a charged plate and an electrometer he quantitatively determined the variation of intensity of X rays with variation in pressure within the tube. In the same month C. T. R. Wilson observed the formation of clouds within his expansion chamber due to the passage of X rays. The fact that both the cloud so formed and the conductivity produced in air persisted after the X rays had been cut off, led directly to the investigation of the positive and negative ions, thence to the discovery of the electron, and later to the formulation by Thomson of a theory of atomic structure.

Many unsuccessful attempts were made during 1896 to reflect, refract and polarize X rays, and it was left for Friedrich, Knipping and Laue to refract X rays in 1912, and for the Braggs in 1913 to show that they could be reflected and to devise the X-ray spectrometer. This discovery had important consequences. On the one hand Moseley was able to demonstrate the spectrum of X rays, measure their wave-length and indicate the fundamental nature of the atomic number of the element. This work was of value in the development of the Rutherford-Bohr theory of atomic structure. On the other hand, the Braggs conversely used X rays in the determination of crystal structures, a subject which is still of profound theoretical and practical importance.

The practical value of X rays in detecting cracks in castings and similar defects was recognized at an early stage. In January, 1896, both the German and the Austrian Ministries of War were interested in the possibility of using X rays to detect defects in guns and armour plate, while at Yale radiographs of faulty welds were obtained in February. X rays were used in March in the Carnegie Steel Works, while arsenals of both United States of America and Great Britain began investigations into the use of X rays in this connexion. In the same month X rays were used in England to demonstrate coins posted within newspapers contrary to regulation, while the use of X rays in the examination of packages by customs officials was reported from France.

Although X rays were used in industry to a limited extent for many years, a great increase in their use occurred during the recent war. Industrial radiography can be used in two ways, either as a guide in perfecting a satisfactory manufacturing procedure, or as a test of all manufactured products. In the latter case it provides the only non-destructive test of freedom from defect. In the manufacture of munitions and aeroplanes, it is now often specified that all castings of a certain type, or all assemblies, should be subjected to radiographic examination.

It is difficult to realize the extent to which industrial radiography has developed. Prior to 1940, practically no industrial radiography was practised in Australia. Today, there are in continuous operation (principally in five centres under the control of the Munitions Supply Laboratories) no fewer than six 250 kilovolt units, six 220 kilovolt units, eight 140 kilovolt units and three 100 kilovolt units. Some idea of the great volume of work which has been carried out in industrial radiography can be gained from the fact that at one centre in Melbourne 694 16-inch by 12-inch films were completed in one normal working day. When routine examination of components was being carried out, as many as 1,000, and in one case 7,000, items were radiographed on the one film. In contrast to this, in the examination of large castings and similar objects, as many as 250 films have been used. In Great Britain and in the United States of America astronomical figures have been reached. In fact, one manufacturer quotes an automatic processing unit, ready for installation, which in one hour develops, fixes, washes and dries 160 16-inch by 12-inch films.

It is to be expected that industrial radiography will play an increasing part in the development of peace-time secondary industries.

X-ray equipment of a special type has been designed for industrial radiography. For the light alloys, tubes with windows of beryllium operating down to 20 kilovolts have been used. For heavy alloys and greater thicknesses, reasonably portable units operating to 2,000 kilovolts are available. A recent development which promises considerable advantage in industrial radiography is the betatron developed by Kerst in 1940. By means of this principle, equipment occupying a small space can produce X rays of up to 20 million volts. Because of the almost complete absence of scattering at this voltage, clearer radiographs of small articles have been obtained than by the use of 200 kilovolt radiation. Further developments in this field are being awaited with interest.

A special application of radiography in industry (called microradiography) has been developed to assist in the investigation of metallurgical problems. A great deal of information regarding the properties of an alloy can be obtained by the microscopic examination of polished surfaces whereby the crystal size and nature of the crystal interface can be observed. In microradiography thin sections of an alloy (a few thousandths of an inch in thickness) are cut by a special machine, the sections are placed in contact with a photographic plate with a fine grain emulsion, and an exposure is made to X rays. When the resulting radiograph is viewed under a microscope, important information complementary to the usual photomicrograph as to the aggregation of atoms of different densities can be obtained. This method has also been adapted recently to the examination of thin sections of animal and vegetable matter.

It is, however, the medical application of X rays which has been, and always will be, the most important. The radiograph of the human hand showing details of the bony structure produced at the time of his announcement by Röntgen was immediate evidence that X rays could be of value in medical diagnosis. The method was not adopted, however, without some scepticism from the medical profession. At the memorable meeting of the Physico-Medical Society of Würzburg, at which Röntgen read his first paper, a radiograph of the hand of the university professor of anatomy was made and exhibited. Even then, the professor of surgery warned against too much optimism, since he considered that the method scarcely promised to be of much if any value in the diagnosis of internal disturbances.

In general, however, the medical profession was eager to seize on the advantages of X rays in aiding the diagnosis of fractures and in detecting the presence of foreign bodies. Since in almost every large town there was some experimenter who possessed a Crookes tube and an induction coil, and some patient with a known foreign body or fracture, it was not long before the medical practitioners in even small towns had some experience of the possibilities of X-ray diagnosis. By the end of February, more than 30 accounts had appeared in the medical literature of the use of X rays in actual practice, covering the location of foreign bodies in arms and legs, fractures, bone sarcoma, arthritis, calcification of arteries, and teeth. Attempts to trace soft-tissue structure had been carried out by the use of limewater in the arteries of dead subjects, and the intestinal tract had been traced in animals, mercury and lead and bismuth salts being used.

In February, in Bristol, a convincing demonstration was made of the value of X rays in locating foreign bodies. Into an amputated foot were inserted nine foreign bodies (comprising metallic fragments, needles and glass). Only one of these was detected by a surgeon; but the position of six was demonstrated by X rays. In April, the British Army announced that it was taking X-ray equipment on the campaign in Africa, while the Saint Petersburg Medical Academy was granted £500 to investigate the applications of X rays in practical medicine. In the same month the New York Medical College included instruction in the use of X rays in its curriculum, while fluoroscopic examinations became common.

In May, the first journal on medical radiology appeared, as the *Archives of Clinical Skiagraphy*; this journal still continues today under the name of *The British Journal of Radiology*.

In July, McIntyre, of Edinburgh, photographed the fluorescent screen on small size plates, and by April, 1897, had produced 35 feet of film demonstrating the leg of a frog in motion.

During 1896, many attempts were made to radiograph the abdomen and skull. Because of the low-powered equipment available, however, most of the work of the radiologist in the early years was limited to the extremities and the chest.

It is interesting to trace the development of radiology in Australia, taking *The Australasian Medical Gazette*, a monthly publication, as a source of information. The first reference to X rays is an editorial in the issue of February, 1896, which reads as follows:

> *Photography and Medical Science.*
>
> Some few weeks ago the Australian public were startled by an announcement by cable that a method of photographing objects through opaque media was being utilized by the medical profession in England for the purpose of examining the interior of the human body, and some enthusiasts went so far as to assert that fractures and diseases of bones might be diagnosed by its employment.
>
> We live in an age when the performance of apparently impossible tasks is of daily occurrence, yet we believe that such an announcement is, to say the least, premature. Possibly, what is now engaging the attention of the profession is the photographing of the cavities of the body, *e.g.*, the stomach, bladder, or eye. This is, however, not entirely new. A couple of years ago Dr. Kollmann, of Leipsic, described, in one of the German medical journals, a method of photographing the living urethra. Dr. Kollman so modified Oberlander's urethroscope as to enable it to carry a small camera, by means of which he obtained some very clear negatives of the mucous membrane of the urethra, both healthy and diseased. Mr. Lucien Howe, of Buffalo, U.S.A., in a paper read before the Ophthalmological Society of the United Kingdom, in October, 1893, described a method of photographing the interior of the eye by means of orthochromatic plates. Probably these facts have been enlarged upon, and the sensational cablegram referred to is the result.
>
> Undoubtedly photography is a great aid to medical men. By its means we can show clearly the progress of a case, and the benefits derived from surgical operations. If photography in natural colours should ever become an accomplished fact it will be invaluable in study of skin diseases. Every large hospital throughout the Australasian colonies should possess a dark room fully equipped, and it should be the duty of the resident medical officer to obtain photographs of all interesting cases in the wards.

It is evident, however, that the possibilities of the discovery were soon appreciated. In the March number of the same journal, there appeared a well-informed article on "Rontgen's Skeletal Picture Process", in which the following statement was made:

> What bids fair to be a most useful addition to our methods of precision in diagnosis has lately been discovered by Professor Roentgen. . . .
>
> The surgery of the future will be more exact than ever, and human suffering be avoided by the disuse of the probe and abandoning the manipulations so necessary now in diagnosing fractures.

In the May number of *The Australasian Medical Gazette*, a booklet on the new photography, published in London, was reviewed. With reference to X rays, it was stated that "their practical use in surgery and medicine is becoming numerous and promises brilliant results in the near future". In the June number the first copy of the *Archives of Clinical Skiagraphy* was reviewed, and it was stated that "X rays are now so familiar to our readers that it is unnecessary to say more than that the publication is exceedingly valuable as showing the methods employed and the results obtained".

The presidential addresses of the various medical associations throughout Australia during 1896 include many references to the discovery and use of X rays. In September, the retiring chairman of the Ballarat District Medical Society spoke as follows:

> I must direct your attention to some recent advances which absolutely refute the notion held by so many that medicine and surgery are stationary arts. On the day preceding the opening of the International Medical Congress at Dunedin we were startled at reading a newspaper telegram which stated that doctors were using Röntgen's discovery to render easily visible gallstones, stones in the bladder, and injuries to the bones. There was such a deep-seated conviction that the whole thing was a hoax that no one had the courage to make the slightest allusion to this telegram during the sittings of the congress, and yet within a few months afterwards we are getting the most excellent results from this process at the School of Mines in Ballarat, thanks to the enterprise of the staff at the institution. It is quite impossible to predict the marvellous importance to us as an aid to diagnosis of disease and injury that exists in the future development of skiagraphy.

In December, the President of the Victorian Branch of the British Medical Association said:

> Let me in the first place direct your attention to that most extraordinary development of physical inquiry—the Röntgen rays. Here, we are face to face with what promises to be one of the most important and practical discoveries of the century. Though still in its infancy, the science of skiagraphy has already established its claim to recognition as a most important aid to surgery. Early in the present year, while the rays were yet but little known, we had, through the courtesy of Professor Lyle, the pleasure of witnessing a most interesting and able demonstration of their development and properties, and more recently still we have had important proof brought before us by Mr. Selby—an expert and capable investigator—of their practical application to medical science. Such demonstrations have, in all countries, attracted a good deal of attention to the rays, and many distinguished physicians are today of opinion that, in the not distant future, they may with advantage be associated with physiology and medicine as a curative medium. It has been found that tissues long exposed to their action become very irritated; that under their influence metabolism is increased. This suggested the hope that the long-continued action of transmitted rays may produce in many pathological conditions a salutary stimulation.

Some other topical comments regarding X rays are possibly of interest. During 1896, after a serious railway accident, a paper by Dr. S .T. Knaggs urging the desirability of periodical examination of the eye-sight of railway men and ship's officers was being discussed when Dr. J. W. Springthorpe said: "Behind the most perfect machinery always remains the question of human manipulation. Even the X rays required the interpreter." In contrary vein is the opinion expressed by a Queensland surgeon, who, having described the removal of a revolver bullet from the head by means of a probe, finished with the following words:

> With regard to the value of the Röntgen rays in a case like the above, even if the bullet could have been localized at the time and extracted, the probability is that the hæmorrhage from frontal sinus would be severe, and also obstruct the view, while the result could not have been more favourable. It possibly may be rank heresy on my part to make such an assertion, but I believe that the surgeon who depends on the Röntgen rays for the diagnosis of fractures, dislocations, etc., is

likely to do so at the expense of the "Tactus Eruditus", which it is necessary to develop to the utmost, so as to manipulate the injured parts into their proper position. It is only in very exceptional cases that the rays are ever likely to be actually required, and I look to see it in the course of time, after, possibly, thousands are spent on it, relegated, like the "Carbolic Spray Apparatus", to the relics of the past.

Finally, the presidential address of the Melbourne Medical Association in September, 1896, deserves quotation:

> Perhaps . . . I should address you on the purely scientific advances of the last twelve months, and foremost, as a necessity, must come the discovery of the power of X rays by Prof. Röntgen. It would be merely vain repetition to more than mention this discovery. . . . When one reads, however, of the advances made in any new movement in the countries of the old world, it seems absurd that a Government like ours, which looks after manual labourers with a grandmotherly interest, should treat our small band of scientists with the niggardliness always displayed to them. There is no attempt to encourage original research in any way whatever. Any advance in this colony is done from the pure love of science itself, and generally at a financial loss to the individual who undertakes it.

Certainly we have advanced a long way in fifty years!

It is interesting to note that physicists played an important part in the introduction of the use of X rays in Australia. It was reported early in March, 1896, that Professor Lyle in Melbourne had made a number of successful experiments with X rays, and later in the month he gave an exhibition attended by a large number of members of the Victorian Branch of the British Medical Association. Later, Professor Lyle assisted in radiographing patients from the various metropolitan hospitals, and the appreciation of his work was expressed by his election to an honorary membership of the Victorian Branch of the British Medical Association. During May, Professor Threlfall, of Sydney, gave a similar demonstration to the local members of the medical profession, and in June, Professor Bragg, of Adelaide, followed with cases in which radiographs had been taken at the Adelaide Hospital. Even in country districts, science teachers in schools produced radiographs. In August, the Ballarat School of Mines was undertaking radiography for the local hospital, while in the same month a gunshot wound was radiographed in Bathurst at the local Saint Stanislaus' College.

It was not long before X-ray departments were established in Australian hospitals. One of the earliest practitioners to use X rays was Dr. F. J. Clendinnen, of Melbourne. By 1898, the Melbourne Hospital had a regular department equipped at a cost of more than £375 with Dr. Clendinnen as the honorary "skyographist". Later, the Alfred Hospital, the Children's Hospital and Saint Vincent's Hospital established X-ray departments with which were respectively connected Dr. Beckett, Dr. Hewlett, and Dr. Herman Lawrence.

In Sydney, in June, 1896, Dr. Quaife donated £100 to the Sydney Hospital "for the purpose of obtaining the most perfect apparatus for the practical production of X rays to be used in the diagnosis of disease and injury in the interest of suffering humanity". Later, an X-ray department was established under Dr. L. H. Harris. X-ray departments were also established at an early date at the Royal Prince Alfred Hospital and at Saint Vincent's Hospital.

Subsequent developments in the field of diagnostic radiology have been due almost entirely to the efforts of radiologists, except in so far as physicists and electrical engineers have produced more efficient equipment. By 1907, induction coils began to be replaced by transformers with mechanical rectification. In 1913, the Coolidge tube with thermionic emission permitted larger and controllable current and voltage characteristics, and, with a tungsten target, much higher capacity. By 1917, the use of Coolidge tubes directly to transformers considerably simplified all lower-powered equipment. Shockproof equipment was introduced in 1919, and by 1926 valve rectification was becoming general. The development of non-toxic radio-opaque materials and drugs enabled radiographic and fluoroscopic examinations to be made of practically all organs of the body, until today the X-ray examination is an indispensable section of diagnostic medicine. It cannot be claimed, however, that diagnostic radiology has as yet reached a static condition. The rapid development of industrial radiography, and the fundamental investigations which have been made into the exposure requirements for radiographs so that they will show the least possible defect, have thrown new light on some aspects of radiography. The importance of these facts in the medical field is now being examined. During the last five years, the interest of the radiological physicist has been directed more and more towards problems in diagnostic radiology, and a considerable amount of investigational work is now in progress.

The application of X rays in the treatment of disease was also surprisingly rapid. It may not at first sight be expected that X rays would be thought likely to have any therapeutic value; but these possibilities were investigated almost immediately. Even though Röntgen had stated that X rays had no action on the retina of the eye, many false hopes were raised as to the possibility of an "X-ray sight" for the blind. Many workers, probably because of the known bactericidal action of ultra-violet light, irradiated bacteria and bacilli, including those of tuberculosis, anthracosis, typhoid fever and diphtheria, with negative results. Experiments on plant and animal matter were also interpreted as indicating that the rays had no biological reaction. These negative results can now be understood, because of the extremely weak intensities of radiation which were then available; but it is possible that as a result the early workers saw no reason to protect themselves against irradiation. By April, 1896, reports of blistered skin similar to sunburn and of epilation in X-ray workers began to appear in the literature. Many medical men were unwilling, however, to admit that these results were due to the X rays themselves, suggesting that they were due rather to some form of ultra-violet radiation produced along with the X rays, or to the chemical effects of the barium-platino-cyanide and other phosphors used in fluorescent screens. Many of the dermatitis effects apparently healed quite rapidly, while the epilatory effect was considered to have useful applications rather than to be a danger. By the end of August, however, several reports had appeared of extensive damage to hands and face, and evidences of radiation sickness were described. Although it appears that X-ray workers to some extent discontinued their exposure when definite evidence of skin damage occurred, they returned to their work when apparent healing occurred. This fact, coupled with the ignorance of the long-term effects which gave no early visible evidence, led to the unhappy experiences of many pioneers.

One case of early skin damage reported in 1896 is interesting. An apprentice to a London surgical instrument maker was used as patient in an attempt to radiograph the spine. He was exposed for one hour to a tube five inches from the skin. The skin reaction was severe, and a coloured photograph of this was reproduced in the report. After treatment, the ulcer healed within three months. In the discussion on the case, it was suggested that protection from the X rays might be obtained by the wearing of red clothes, or by smearing the skin with a red washable paint.

The power of X rays to destroy tissue was, however, soon used as an alternative to surgery to destroy unhealthy tissues such as cancerous growths and lesions of the skin. Before the end of 1896, reports appeared of apparently amazing cures of superficial malignant lesions. Unfortunately, in many of these cases lesions recurred at a later date, owing to inadequate dosage. Nevertheless, in the early years of this century the reports of X-ray departments showed that many more patients attended for treatment than for radiography; this is perhaps understandable, as radiography was still principally limited to examinations of the extremities.

The early developments in the use of X rays in therapy were due almost entirely to the radiologists. Although in this field a considerable amount of association with

physicists was required, this does not appear to have taken place. Since the primary problem in radiotherapy is to deliver a radiation dose adequate to destroy the diseased cells without permanently damaging the healthy cells, and because in many cases this margin is small, the most important question was the determination of the quantity of X rays being delivered to any patient. For many years this was mostly expressed in terms of time, tube current and tube voltage, although with gas tubes and induction coils the measurement of the two last-mentioned factors was often crude. In 1902, some attempt was made to define X-ray quantity in terms of the intensity of illumination of the fluorescent screen, followed the next year by a method based on the change in colour of chemical compounds. In 1905, attempts were made to measure dosage by means of the photographic effect. A method involving the change in resistance of a selenium cell was proposed in 1915. Various ionization methods and units were proposed in 1908, 1914, 1916, 1918 and 1925; but these units were ambiguous, and although they were of some use within one hospital, they were not suitable for general adoption. It was not until 1928 that a unit of X-ray dosage (the röntgen or *r*) based on an ionization method was adopted internationally, and in 1937 the definition was somewhat modified and extended to include γ rays. Since no subject can be regarded as a science until it is truly quantitative, it will be realized that radiotherapy has only recently qualified as an exact science.

Röntgen lived to see the development of many of the applications of X rays. In 1899 he refused the chair at Leipzig, but the next year he accepted the directorship of the Physical Institute at Münich. In 1904, he refused the directorship of the Reichsanstalt. In Münich he did no further work in X rays, but concentrated upon investigations into the properties of crystals. He retired in 1920, but did not enjoy many years of leisure. He died on February 10, 1923, and was accorded a State funeral.

Röntgen received many medals and honorary memberships from scientific and medical societies throughout the world. In 1900, he was the first Nobel Prizeman in Physics.

It is frequently stated that the discovery of X rays was made accidentally by an obscure teacher of physics. After a study of the facts, however, all must agree that the discovery of X rays resulted from the careful experimental work of a number of scientists, leading to the final opportunity of one who was trained to observe, and having observed, sought the cause. Today, when public attention is once again focused on another spectacular discovery of physics, it is necessary to emphasize again that the brilliant discoveries of science have all been built on foundations of fundamental investigation by competent workers, and that they always will be. More than that, it should be widely realized that if the successes of science are rightly used, they can, as in the case of X rays, prove a blessing to mankind.

VOLVULUS OF THE SMALL BOWEL, WITH REPORT OF A CASE TREATED BY RESECTION WITH RECOVERY.

By D. M. EMBELTON and PAUL JONES,
Melbourne.

Most surgical writers and surgical textbooks remark on the rarity of the condition of volvulus of the small bowel, and the cases recorded are not many in view of the enormous amount of surgical treatment that is now given for abdominal "emergencies". The correct diagnosis is not often made before operation, and a successful ending is not always the result.

Incidence.

Any portion of the alimentary tract suspended by a mesentery may twist upon its axis, but some parts of the digestive tube are affected more frequently than others. The commonest site of volvulus[1] in the belly is usually stated, and believed to be, the sigmoid colon. Next in frequency is the loop comprising the terminal portion of the ileum, the caecum and part of the ascending colon; then come the small bowel and, lastly, the stomach. Vick's[2] figures, however, in a series of 176 cases of volvulus, were as follows: small bowel, 85 cases; caecum, 35 cases; sigmoid, 56 cases.

Volvulus of the stomach[3] is an extremely rare condition. Brigadier W. A. Hailes, the distinguished teacher of one of us, has reported a case in this journal in great detail.[4] The patient made an uneventful recovery.

The incidence of the disease is, however, widespread, but it appears to be more frequent in the Union of Socialist Soviet Republics and the Scandinavian States. In a series of 153 cases collected by Falkin of Helsingfors and reported by Gowdy[5] a little more than half the number of cases of intestinal obstruction were due to volvulus.

Although cases occurring in the new-born and the young have come under our notice, and as congenital malformation may play a part in the ætiology of the malady, it is rather surprising that volvulus is a disease of the adult male, who is affected about twice as frequently as his female partner.

Ætiological Factors.

Cases in the new-born are nearly always associated with a long mesentery or other malformation in the development of the alimentary tract. In the adult, however, other factors such as peritoneal adhesions, obesity, pressure from tumours or cysts and abdominal distension from food or flatus seem to play at least some part in the causation of the disease. Frequently, however, no cause can be discovered, as in the case reported.

Signs and Symptoms.

No one sign or symptom or sequence of events is specific of the condition, and so, in view of the variety of clinical pictures, a correct diagnosis is not often made. In some cases, previous attacks, not so severe, have been encountered.

The disease most often commences with a sudden attack of pain in the centre of the belly. The pain is severe at its onset and increases in severity with each recurring bout. With the pain develops a feeling of nausea, and later vomiting occurs; this may develop into an offensive type if the condition is unrelieved.

The failure to open the bowels is not a clue to the diagnosis in the early stages. Bowel content may be normally passed or evacuated with flatus after an enema, and yet an intestinal obstruction may exist. This clinical finding should not lull one into a sense of false security, so that an exploratory laparotomy is delayed.

Some degree of shock may be noticed. This is especially so in infants, but it is also noted in adults if the rotation of the gut is extensive and rapid. The temperature is frequently subnormal or normal, or it may be slightly raised. The pulse rate is often not hurried at the commencement of the illness, but it gradually increases as the condition progresses.

The clinical signs are often less obvious than the symptoms. The pain may not be definitely localized and the area of tenderness may be vague—umbilical or upper or lower abdominal. Rigidity does not occur early, and the abdominal wall can be made to move with gentle respiration. Later, when the disease has persisted for some hours, abdominal distension, free fluid in the abdominal cavity, copious vomiting and other signs of the rather hopeless intestinal obstruction are present.

In a case reported by Parton[6] no vomiting, no distension and no constipation occurred, and the pain was not colicky.

Treatment.

Immediate surgical treatment is indicated. As soon as the patient comes under the care of the physician, arrangements should be made for an emergency laparotomy. Anti-shock measures should be available before, during

or after the operative procedure, which consists of a rapid laparotomy and the untwisting of the loops of the bowel; this can be accomplished only by the complete exteriorization of the mass of distended, plum-coloured intestine. It is seldom possible to uptwist the bowel while the volvulus lies within the abdominal cavity, and valuable time may be wasted and damage done in unsuccessful attempts. If the gut is viable, it is returned into the abdomen, but if it has lost its vitality, a resection with restoration of the continuity of the bowel is performed.

Short-circuiting anastomosis or treatment without resection has not been successful in any case we can find recorded. It is our opinion that any attempt to deal with the cause of the volvulus *per se*, or to delay in the operation by removing an innocent appendix, or to perform any other unessential procedure, is not in the interest of the patient. Free fluid, often blood-stained, is sucked away and absorbed in packs during the operation. Drainage in the abdomen is usually not necessary.

Report of a Case.

W.J.G., a male patient, aged sixty-one years, married, was examined by one of us (D.M.E.) at 2 a.m. on June 25, 1943. He had been well until 9.30 p.m. on the previous evening, when he was suddenly seized with acute, griping, abdominal pain in the region of and below the umbilicus. The bowels had not been opened and he had not vomited until he induced the return, by inserting his finger down his throat, of some castor oil which he had taken at 10 p.m. He had had no previous illnesses and had lived an active life as a workshop manager.

On examination the patient was found to be tall, spare, alert and restless, and complaining of severe abdominal pain. The temperature was 98° F. and the pulse rate 84 per minute. The heart and lungs were normal on clinical examination; the systolic blood pressure was 150 millimetres of mercury and the diastolic pressure 70. The abdomen was flat and soft. Slight tenderness was present over McBurney's point. Rectal examination revealed no abnormality. The urine contained a trace of albumin; on microscopic examination no abnormality was detected.

At 2.30 a.m. a hypodermic injection of morphine and atropine was given, but this did not stop the pain, and the patient was examined again by one of us (D.M.E.) at 4.30 a.m. There had been no further vomiting, but the abdomen was as rigid as a board all over, and he appeared to be suffering from shock. The temperature was 97° F. and the pulse rate was 80 per minute.

A pre-operative diagnosis of acute appendicitis was made, and the patient was anæsthetized by Dr. Dorothy Gepp with ethyl chloride and ether given by the "open" method. The operation commenced at 7.30 a.m., the delay being due to difficulty in obtaining hospital accommodation. A McBurney's incision was made, but when the peritoneum was reached, free blood was noticed beneath it, so the abdominal cavity was not opened there. The patient then was noticed to have stopped breathing, and the pulse was almost imperceptible, but with artificial respiration and an intravenous injection of "Coramine" recovery became sufficient for the operation to be continued.

A right paraumbilical incision was quickly made and the abdomen was opened; much blood-stained fluid escaped, but no clots of blood. The whole abdominal cavity appeared full of the blood-stained fluid, which was aspirated away and soaked up by packs. The presenting lower loops of ileum appeared normal, and a hand passed up towards the left upper quadrant of the abdomen to feel for the spleen felt a large mass of bowel. The wound was enlarged upwards and the "mass" was inspected. It was a large volvulus of the upper jejunal loops, which were distended, blackened and obviously gangrenous. The volvulus was exteriorized and unwound and rapidly resected with its mesentery. These loops appeared to contain seven or eight feet of bowel. The lower end to be anastomosed, however, did not appear to be sufficiently viable, so approximately another foot or so of bowel was resected. An end-to-end anastomosis with linen sutures and the closing of the abdominal wall in layers (both incisions) completed the operation at about 8.30 a.m.

The patient was suffering severely from shock by this time, so glucose and saline solution was given by the intravenous drip method through his right saphenous vein, and this was continued until two litres had been given, when it was seen that he was in fair condition.

The patient's further convalescence was uneventful, and he was discharged from hospital on July 16, 1943. In another few weeks he was out and about, and by the end of August he had regained his normal weight of 11 stone 9 pounds and was taking a full diet, and his bowels were working regularly.

Since the operation he has been examined at various times. He is well and is back at his job, working as well as before his illness—now almost two years ago.

The specimen, unfortunately, was not saved, but it filled and overflowed an ordinary ten-inch porringer, and as a conservative estimate, its length must have been just less than ten feet.

Summary.

1. A case of volvulus of the small intestine is recorded in a healthy adult male. The volvulus was resected and recovery ensued.

2. A short account of the ætiology, signs, symptoms and treatment is added.

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OBSERVATIONS ON PSYCHOSES OCCURRING IN SERVICE PERSONNEL IN FORWARD AREAS.

By H. J. B. STEPHENS,

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THE observations here recorded were made on clinical material, in which the following common characteristics were present: (*a*) All patients were male members of the armed forces, of the twenty to forty years age group. (*b*) All were serving in tropical or subtropical areas, experiencing psychological stress associated with separation from their homes and families, with service life and discipline, and with restriction of normal social and sexual activities. (*c*) In addition, many had experienced battle or air raids. Some had suffered repeated attacks of malaria, and all had daily received suppressive treatment with "Atebrin". Many had difficult home problems, others had remained for long periods without leave. The majority were of the Class A medical category.

Clinical Picture.

The usual type of psychoses encountered in civil life occurred. The schizophrenic reaction types appeared more common than the manic-depressive types. It was difficult in the early stages of the psychosis to differentiate between *schizophrenia simplex*, katatonia, hebephrenic schizophrenia and paranoid schizophrenia; but it appeared that the paranoid states, including the paraphrenias, were more frequently encountered than in civil life.

In this group of cases, evidence was found of hereditary taint, early personality defect or actual psychotic episode in civil life. The course of the psychosis and response to treatment were as expected, and presented no unusual features.

There is another, larger group, which presents certain interesting factors. Characteristic is the absence of hereditary taint or past history of psychiatric disability. These men gave a history of a normal, well-balanced life previously, with no evidence of undue introversion or extroversion. Some may have experienced campaigns in the Middle East and the islands without apparent ill-effect.

In a few cases there may be evidence of exhaustion, toxæmia or recent serious illness, but in the majority there appears no definite ætiological factor.

The onset is of a particularly explosive, acute nature. A man may have been perfectly well one day, and in a few hours' time may present the signs and symptoms of florid, acute psychosis, requiring heavy sedation and restraint. However, some may have shown prodromal signs and symptoms for a few days or weeks. If they remain untreated, their habits rapidly deteriorate, they become emaciated and dehydrated, and they may require tube feeding. Pyrexia is common and death may ensue. Often some insight is retained, and the impression gained is that there is almost an element of voluntary release of control. The outstanding characteristic is the acuteness and severity of the disorder, and the picture is that of manic or katatonic excitement, rapidly changing from one to another of the commoner clinical types of psychoses.

The following cases illustrate the acuteness of the onset:

CASE I.—A private soldier, aged twenty-two years, single, was a machine gunner with forty-two months' service. He had been a costing clerk for four years in civil life, and his intelligence was above average. There was a history of psychosis in a maternal aunt. His personality had shown no previous defect, he was sociable, a "good sport", temperate and a popular man. He had experienced no undue battle stress, nor had he suffered from malaria. His officers reported that his behaviour had suddenly become eccentric. The patient himself stated that he had had a sudden revelation during the night. He believed that God had spoken to him and told him to carry a message and a plan to his fellow men. He aroused his mates, and said that he was a mouthpiece of God and had to transmit His message like a microphone. He stated that he had been given tremendous willpower and was impervious to pain. To demonstrate this, he thrust a rusty screw-driver completely through the palm of his hand until it protruded on the dorsum. He also burnt his hand with cigarettes. He rubbed his wounds in the mud, asserting that nothing untoward would occur, as his blood had been purified.

On his admission to hospital he was in a florid psychotic state, showing marked psychomotor hyperactivity. He was voluble, destructive and noisy, and had ideas of reference; he was deluded and admitted auditory hallucinations. His temperature was 100·4° F. and he looked toxæmic. He refused all food, but would take milk. Repeated examination of blood films revealed no malarial parasites, and physical examination disclosed no evidence of organic disease. He presented the picture of manic or schizophrenic excitement of sudden onset.

CASE II.—A leading aircraftman, aged twenty-four years, single, had had two and a half years' service. He gave no history of psychosis in near relatives or of previous psychiatric disability himself, and prior to his enlistment he was a school teacher. His habits were normal, he was usually a temperate drinker, a moderate smoker, a "good sport", and sociable, with male and female friends. He had been for three months in the islands and had been on no operational flights, nor had he suffered from malaria.

He was perfectly well mentally, being in hospital to receive treatment for tinea, when he suddenly became voluble and noisy. In a few hours' time his speech was quite irrelevant. He frequently used foul language, even in front of the nurses. He developed a fatuous grin, and grimaced with sly, knowing winks. He had ideas of self-reference, was grandiose and maintained he was Saint Anthony. Considerable psychomotor activity was present, and his condition deteriorated rapidly. He made immoral suggestions, had faulty habits and exposed himself in public. He appeared to have auditory hallucinations, but he would not admit these. He was quite non-cooperative and inclined to be aggressive. His temperature rose to 100·6° F. and his pulse rate to 100 per minute.

There was no evidence of any organic disease, except tinea, and examination of several blood films revealed no malarial parasites.

Treatment.

"Cardiazol" or Electro-Convulsive Shock Therapy.

A gratifying feature is the rapid and apparently complete remission or even cure obtained by shock therapy in the majority of these cases. Frequently six or seven "Cardiazol" or electro-convulsive shocks suffice. After such a shortened course of shock therapy, the memory defects and slight dulling of intellect usually resultant from this therapy are not apparent.

An endeavour was made to ascertain whether convulsive shocks produced any change in the biochemical condition of the cerebro-spinal fluid. To this end a group of patients

TABLE I.

"Cardiazol" and Electro-convulsive Therapy and the Cerebro-spinal Fluid in Five Cases of Acute Confusional Psychosis (Schizophrenic Nature).[1]

Patient.	Age. (Years.)	Time Between First and Second Lumbar Punctures.	Lumbar Puncture.	Result.					Number of Convulsive Treatments.
				Cells.	Protein. (Milligrammes *per Centum.*)	Globulin.	Wassermann Test.	Colloidal Gold Curve.	
R.A.	21	4 days.	First.	Two lymphocytes per cubic millimetre.	30	Not increased.	No reaction.	No significant change.	"Cardiazol" 1
			Second.	One lymphocyte per cubic millimetre.	25	Not increased.	No reaction.		
A.P.	23	5 days.	First.	Count normal.	25	Not increased.	No reaction.	No significant change.	"Cardiazol" .. .. 4 } 6
			Second.	One lymphocyte per cubic millimetre. metre.	30	Not increased.	—		Electro-convulsive .. 2 }
N.F.	23	17 days.	First.	Count normal.	30	Not increased.	No reaction.	No significant change.	"Cardiazol" .. .. 3 } 6
			Second.	Two lymphocytes per cubic millimetre.	30	Not increased.	—		Electro-convulsive .. 3 }
B.W.	29	7 days.	First.	No increase in cells.	15	Not increased.	No reaction.	No significant change.	"Cardiazol" 8
			Second.	No cells seen in two cubic millimetres.	30	Not increased.	—		
M.K.	47	5 days.	First.	Count normal.	20	Not increased.	No reaction.	No significant change.	"Cardiazol" .. .. 5 } 8
			Second.	No cells in two cubic millimetres.	30	Not increased.	—		Electro-convulsive .. 3 }

[1] The least time that elapsed between the first and second lumbar puncture was four days, and the shortest time between the treatment and the last lumbar puncture was twenty-four hours. Owing to the uncertain rate of complete renewal of the cerebro-spinal fluid, this period may be too long; but the findings probably indicate that no significant change in the biochemical condition of the cerebro-spinal fluid occurs as a result of "Cardiazol" or electro-convulsive shock treatment.

was submitted to lumbar puncture before shock treatment and at an arbitrary period after a varying number of shock treatments. The results were as shown in Table I.

Insulin Shock Therapy.

The exhausted, emaciated type of patient does particularly well when submitted to insulin coma treatment. It is rarely necessary to induce coma for a total of more than 20 hours. Combined convulsive and insulin therapy is necessary only in exceptional cases. In many cases satisfactory improvement is produced by hypoglycæmia alone, and the amount of insulin is not raised to the full coma dosage.

The following case illustrates the dramatic response to shock therapy.

An allied serviceman, aged twenty-one years, single, had been a farm labourer before enlistment. There was no evidence of psychosis among his near relatives or in his own history. He had served for two years, seventeen months of which were away from home. He did not experience battle or suffer from malaria, but he had been in a few air raids. His officer and his mates reported that he had always been a conscientious soldier, sober in habits and normally sociable.

He was admitted to hospital with the history that during the last two or three weeks he had become increasingly quiet and seclusive. His officer stated that he had become vacant in manner, restless and unable to complete a job, and he was eccentric at times. For example, he asked for his equipment to be checked, as he feared he had articles belonging to others. He also expressed the belief that there were dangerous germs on his clothing which nothing could remove.

In hospital he was at first mute and inaccessible, frequently crying, but at other times sitting in a fixed, dejected attitude. He appeared to have auditory hallucinations. His clinical picture resembled that of hebephrenia.

He was given four major convulsive treatments by means of the injection of "Tetrazol", seven millilitres on alternate days. His response was dramatic. He became alert, industrious and cheerful, and showed no evidence whatever of psychosis. He had no memory of his admission to hospital or of his first injection.

Discussion.

In spite of the excellent response to shock therapy in this type of psychotic manifestation, it is not considered advisable to retain these men in the services, and they are evacuated to base for final assessment and boarding, although it is believed that some could still render continued efficient service without ill-effect.

In view of the doubtful ætiological factors concerned—the somewhat atypical acute onset, the kaleidoscopic change in nature of the psychosis from manic excitement to the various types of schizophrenic or affective reaction types—and, in view of the dramatic response to treatment, with apparently good prognosis, the question arises whether we are dealing with a true psychosis, or perhaps with some hypnoidal state, or even an altogether less grave psychiatric disability. It is to be considered whether these men, representative of the best of our nation's manhood, should be advised against marriage or procreation, or whether the probational period of celibacy should be shortened. The wife or fiancée of a patient suffering from this disability has a right to guidance in these matters.

It is thought that in this type of psychotic episode, schizophrenia or manic-depressive psychosis or other grave conditions should not be given in diagnosis without deep consideration. Some other more general, less known term, such as "acute confusional psychosis" or even in some cases "exhaustion psychosis" would appear preferable. The diagnosis given in a forward psychiatric centre follows a man through his long line of evacuation, and in fact through his life, and even though the clinical picture is changed in time, it is automatically thought that this is probably the result of treatment, and that the medical officer on the spot, who has seen the acute stage, is most likely to have made the true diagnosis. This is not necessarily correct.

It is considered advisable to administer shock therapy early in these conditions—in fact, as soon as organic causative factors can be excluded. It is suggested that final diagnosis and assessment be made late, at the final base area or even after a period of observation in civil life. This would necessitate an out-patient follow-up clinic, such as the repatriation department could provide.

Summary.

1. A survey of psychoses occurring in service personnel in forward areas is presented.

2. Psychotic manifestations of remarkably acute onset are described.

3. Gratifying response to early shock therapy is illustrated.

4. It is reported that untoward effects of prolonged shock therapy are not encountered when few convulsive treatments are administered, and a table is submitted to indicate that the biochemical condition of the cerebrospinal fluid shows no significant change after the convulsions.

5. A plea is made that in this type of psychotic episode, shock therapy should be given early and the final diagnosis made late. The psychosis does not appear to have such a grave prognosis as the usual types of psychoses encountered in civil life.

Acknowledgements.

I should like to record my thanks to the Director-General of Medical Services for permission to publish these observations, to Colonel J. Leah, commanding the general hospital, for permission to publish the case histories, and to Lieutenant-Colonel C. B. Sangster for his help and encouragement in the compilation of these notes.

THE ADEQUACY OF MEDICAL TRAINING.[1]

By BASIL WILLIAMS,
Bondi, New South Wales.

IN Australia 90% of medical graduates eventually drift into general practice. The remaining 10% take on specialization only, or academic and public health work, and some experience in general practice undoubtedly would assist them very much in these spheres. The object of this paper is to find out the types of work met with in general practice, and to analyse the adequacy or otherwise of the training. One thousand consecutive patients form the basis of the following figures:

Medical conditions, subdivided into "acute" and "chronic":

(*a*) Acute conditions: colds, bronchitis, infectious diseases, pneumonia *et cetera* (193 cases).

(*b*) Chronic conditions: heart disease, skin diseases, alcoholism, allergic diseases, metabolic and endocrine disorders *et cetera* (456 cases).

Surgical conditions, subdivided into three groups:

(*a*) Traumatic conditions: cuts, burns, fractures, sprains, dislocations, concussion *et cetera* (165 cases).

(*b*) Acute conditions, in which operation is necessary immediately: appendicitis, intestinal obstruction, abscesses needing operation *et cetera* (46 cases).

(*c*) Chronic conditions: infected tonsils and adenoids, diseased gall-bladders, cysts and most orthopædic conditions (122 cases).

Other conditions:

(*a*) Obstetrics, which includes miscarriages and abortions.

(*b*) Gynæcological conditions (121 cases); endocrine disturbances are omitted from this group, being included in the chronic medical group.

Cases of immunization for diphtheria and whooping cough (64) are not included in any group.

[1] Read at a meeting of the Section of Sociological Medicine of the New South Wales Branch of the British Medical Association on July 18, 1945.

Medical Conditions.

The diagnosis and treatment of acute medical conditions are fairly satisfactory under the present system, the large hospitals being natural places for the collection of this type of case. With the present teaching students tend to regard patients objectively, not subjectively.

The dietetic treatment of patients is not sufficiently stressed to the student. In the medical wards there is a great opportunity to investigate the previous diets of the patients and to suggest alterations for their future guidance. Lectures by the dietitian would be helpful to complete a necessary facet of medical education. Many of the diets given to patients in hospital are poor, judged by the ideal standard; especially is this so in peptic ulcer cases.

It is in the diagnosis and treatment of chronic medical conditions that the training of the present medical student is lacking. In the largest group of chronic medical diseases, which includes arteriosclerosis, high blood pressure and old age, training of the student is not good. These patients form a group of constant out-patient attenders, who are usually examined by the clinical assistants and "stalled off" with a magic bottle of medicine, or divers pills, or both. These people really require psychological and sociological study and have to be seen against the background of their environments. They represent the summation of years of bad living, eating and drinking, family disturbances, economic misfortunes, maladjustment *et cetera*, and can be successfully studied only in their own homes. It is imperative that students shall be made so to study them, to obtain the right perspective of medicine.

What is the good of giving patients diet charts and academic advice and such like when there is little prospect that these will be carried out? It should be possible to arrange for resident doctors attached to the hospital to visit old-age pensioners, invalid pensioners and indigent patients, who cannot afford treatment in their own homes, when they are unable to attend at the out-patient department.

Alcoholism is another sociological illness, which has its being in maladjustments such as those relating to marriage, occupation, leisure, religion. The teaching on this matter is minimal—or rather, practically non-existent; yet alcoholism is a factor which enters into many lives.

Allergic diseases, which constitute another big group, consist of asthma, hay-fever, hives, eczema, urticaria, and in some cases, migraine. These subjects are poorly taught and badly neglected. The problem is twofold, consisting of food allergy in children under the age of six years, and allergy of respiratory mucosa origin from early childhood onwards. With regard to food allergy, warning of the parents when allergy is known to exist in their families would enable the early manifestations to be recognized and adequately dealt with. Infantile eczema as an indication for weaning is not hinted at in text-books; yet the impossibility of keeping the mother's diet free from eggs or whatever offending substance is responsible for the eczema makes weaning an urgent necessity as the only practical means of controlling the protein intake of the child.

The second problem in modern cities is important. It consists chiefly of the attempt to keep houses free from house dust and to a lesser extent from other offending allergens such as feathers, fur, kapok, powders such as orris root and pyrethrum. Most of the allergic symptoms are manifested early in life, and the amount of morbidity that could be prevented by prophylactic training is tremendous, when it is considered that 125 of the 1,000 patients in this series had different allergic manifestations (approximately half of these were suffering from asthma), whereas only 12 sufferers from tuberculosis were seen. If adequate training could be given to students by competent teachers, the prevention and minimization of allergic diseases could be made reasonably successful.

Anxiety neurosis (234 cases) is another section of medicine in which training is minimal, unsatisfactory or non-existent. This figure of 234 grossly understates the amount of anxiety neurosis, inferiority complex and inadequate personality which exists. Only the obvious cases, in which the complaint was of nervousness, worry and allied symptoms pointing to an underlying anxiety neurosis, were included. The successful appreciation of these cases is dependent on the manner in which they are presented to students. Unfortunately a considerable expenditure of time is necessary for the evaluation of these cases, and extremely few clinical teachers are prepared to give adequate teaching on the subject. The fact that the student graduates without making contact with the patients in their homes is another factor in the non-appreciation of the subject. The ideal teacher for this subject is the general practitioner of some twenty years' or more standing, who has learned his psychology by assisting the adjustment of many thousands of patients. Under the present educational system it is extremely unlikely that such general practitioners will ever become clinical teachers, and their knowledge is not utilized. If students in the fifth or sixth year of the medical course could be attached to general practitioners, willing and able to teach, the gain to the student would be enormous, and the necessity of learning the psychology of practice by the trial and error system which pertains at present would be obviated. The apprenticeship system which was in vogue until a century ago had many good points, which were unfortunately abandoned when medical training in its present form was adopted. A combination of the better points of both systems should give a greater advantage than rigid adherence to one or the other.

Another great advantage to the students would be their attendance at the almoners' department, where the practical needs of general practice are made manifest. If the student grasps the necessities of general practice, he is better able to assimilate the relevant knowledge out of the vast amount that is presented to him. Out of the present 1,000 patients, no less than 560 needed psychological treatment.

Discussion with various colleagues as to the amount of psychotherapy used in their practice has brought forward several interesting points. They have almost universally admitted the inadequacy of training as students, and have estimated that it has taken them some five to ten years to achieve any measure of competency in this branch. By the time they have acquired this knowledge, their practices have usually grown to such an extent that it is uneconomical to treat this type of patient effectively. The kudos and monetary gain, not to mention the thanks of the patient, after the successful treatment of an acute condition of the appendix, a fractured bone and such like, completely overshadow the vast amount of time, patience, poor results and lack of thanks from patients, which in some cases amounts to actual hostility, attendant upon any attempt to alter their erroneous mental adjustments. In the words of one doctor, he would scarcely earn the basic wage if he practised the necessary psychotherapy which he realizes is badly needed.

The people are entitled to as good a medical service as possible, and the medical practitioner who gives phenobarbital or bromides for mental upset without endeavouring to find the true cause and alleviate it is as culpable of malpractice as one who treats a patient for a chronic cough with soothing syrups and without exhaustive physical examination.

A recent memorandum on therapeutic social clubs in psychiatry, which was published at page 861 of the *British Medical Journal* of December 30, 1944, shows an awakening realization of the need for psychotherapy for the masses. The following symptoms are those that have, so far, been combated through social clubs: (*a*) shyness and loneliness, (*b*) general and social inferiority feelings, (*c*) sexual maladjustment, (*d*) lack of incentive and aim in life, (*e*) inability to cooperate with others, (*f*) anxiety and phobias, (*g*) parental domination, (*h*) acute disappointment, (*i*) psychological effects of physical defects. The urgent need for these clubs is obvious; they would prove to be one of the greatest factors in preventive medicine ever attempted.

Surgical Conditions.

Traumatic surgery (165 cases) is well taught in the hospitals, and the wealth of clinical material is provided by both in-patients and out-patients. One point of criticism is the lack of psychology in treating these patients. It is

obviously important to adjust a person to the loss of a limb, or to disfigurement or to an illness that is likely to persist for a long time—for instance, a fractured spine or pelvis.

Acute surgical conditions—ruptured ulcers, abscesses including ischio-rectal abscesses—represent only 2% of cases occurring in general practice; but in the hospitals students imagine the figure many times greater on account of the great concentration of surgical conditions in teaching hospitals. The teaching with regard to diagnosis is satisfactory; teaching of surgical technique is not, and some definite policy should be laid down on this matter. Most students are left to their own devices, and receive little if any supervision in the practical part of surgery. Whereas students are prepared for criticism of their technique, once they have graduated they become intolerant of advice and criticism. Even when the student is a resident medical officer, the amount of surgical work given to him is a doubtful quantity, depending on the whims and caprices of the honorary surgeons, who often for purely personal reasons will give their resident medical officers no operative work at all. The young medical practitioner, who usually goes into an isolated country district for his first practice, is faced with the task of performing immediate operations in which he has not had adequate practice. Provision should be made for the doctor to do a certain amount of specified surgical work, in the same manner as an obstetrics student has personally to conduct the confinement of a minimum of 20 patients.

Chronic surgical conditions (122 cases) comprise those requiring operations of election, and personal judgement of the highest order is necessary in many cases. Mostly this subject is well taught, as the cases consist of most of the cases in the surgical out-patient department.

Other Conditions.

Gynæcological conditions comprised 121 cases. More than half of these patients required treatment for inflammation of the cervix only. The teaching of gynæcology to the student is one of the poorest sections in the medical course.

It is doubtful whether a recently graduated doctor can successfully perform a pelvic examination. Approximately half of the patients complain of vaginal discharge, and the majority of them have neurosis associated with it. In the public hospital treatment of gynæcological patients, the psychological aspect is almost entirely ignored. A large number of cases of chronic ill-health are encountered in practice, in which the patient has had a gynæcological operation without any improvement in her condition. The usual story is one of vague lower abdominal pains and backache, for which operation has been advised and performed. The appendix is usually removed and part of one ovary or one Fallopian tube. Despite this, the pain and ill-health persist, and a careful history of the patient often reveals a psychopathic background, such as maladjustment in family life, frustrated hopes *et cetera*. It is essential that the student shall be made to appreciate these cases in their true perspective, and the out-patient department is not a good place to attain this object.

With regard to obstetrics, on the physical side—such as the delivery of the child, the testing of urine, blood pressure, weight *et cetera*—teaching is thorough and comprehensive. The mental side which is the more important is neglected, and the obstetrician is trained without any thought for adjusting the family in its most dynamic phase—that is, the preparation of the parents for the birth of the first child. At this stage there is a unique opportunity for the obstetrician to "check up" on the married life of both parents and make useful suggestions for the better adjustment of family life. Some idea of the problems which will arise after the birth of the baby should be foreshadowed and a practical method of solution put forward. I have yet to see a parent and child who have not required some psychological advice; all have been glad to receive this guidance, which they admit they have been unable to obtain from any source. The almoners at women's hospitals readily substantiate the vast amount of training which mothers and children need, and which is difficult, nay impossible, to obtain. The more time that one spends studying this problem, the more necessary does this work become. Preventive medicine has its greatest scope in this epoch, and the result would be happier and better-adjusted marriages with a diminution in the greatly increasing divorce rate, a considerable lessening of the amount of anxiety neurosis and inferiority complex in the community, and a much brighter horizon for the coming generations. A small percentage of doctors appreciate these factors after many years of practice; but it is only by the correct training of the medical students that their importance will be emphasized and inculcated as a natural part of obstetric training.

Comment.

There is little liaison between the psychiatrist, the surgeon, the physician, the gynæcologist and the obstetrician, and this is greatly to be deplored. Psychiatrists are extremely few in number, hopelessly inadequate to cope with the amount of work which should be done. The solution is to make every general practitioner a practical psychologist, so that the application of his attitude to the great branches of medicine becomes second nature. It seems a Gilbertian situation that psychology, which is actually the physiology of the mind, is not taught as a medical subject and not taught to medical students. The teachers of psychology have no medical training, and very little importance is attached to the psychology of every-day life and its practical application. Would not the medical student benefit more from the study of practical and applied psychology than from the study of physics and chemistry in his first year at the university? These subjects—physics and chemistry—could be made compulsory for the leaving certificate; then the student would have sufficient knowledge of them for a medical course suitable for the general practitioner. If a similar time was devoted to practical and applied psychology as is allotted to physics and chemistry in the present curriculum, the gain to the future generations of medical practitioners would be immense.

Botany could be taught in conjunction with pharmacology and *materia medica* as a practical portion of them. Similarly biology should be taught as a part of and *pari passu* with comparative human anatomy; this would make both subjects more interesting and practical.

For clinical studies the obvious teachers should be the general practitioners, who should have a much larger part in the teaching and training of students. That the concentrated wisdom of older general practitioners—who are semi-retired and who would probably welcome an easier teaching job than that of active general practice—is allowed to go to waste, is an irrecoverable loss to the community. If the authorities who are responsible for the present architecture of the medical curriculum are sincere in their endeavours to acquire a better and completer medical service for the people, and at the same time to advance the prevention of disease, especially subclinical mental illnesses, then cognizance of these facts is necessary. Then the jibe that every doctor takes a hypocritical oath on graduation would lose some of its sting, and the recent declaration of the British Medical Association, made as an answer to the proposed nationalization of medicine, would no longer be merely a string of clumsy clichés and pious platitudes.

THE REMARKABLE "DR." SPENCER.

By RICHARD T. KENNEDY,
Gundagai, New South Wales.

Let all those that are suffering from any complaint or disease, and who are anxious to regain health and escape a WOODEN COAT consult an experienced and successful practitioner
DR. SPENCER
Physician, Surgeon and Accoucheur
South Gundagai.

SUCH was the cheerful advertisement that appeared regularly in the columns of the Gundagai newspaper of

many years ago. John Spencer, for all his title, was not a qualified medical man, but none the less he was a willing trier. In fact it is doubtful whether Gundagai possessed a qualified medical practitioner until the year 1849, in which year an unlucky doctor, J. N. Waugh, commenced practice here—unlucky because he lost all but his life in the great Gundagai flood of 1852.

Prior to that the populace was dependent upon any man or woman who, by God or by guess, had developed small and often questionable talent in bone-setting and minor first aid. Maternity work was relegated to some untrained but motherly old soul, who could later boast that she had brought some fabulous number of squalling infants into this world, regaling her startled audience the while with the sympathetically told tale of her adventures in "them there days". Complicated childbirth meant certain death; it was indeed the misfortune of "Dr." John Spencer, unscrupulous and determined though he was, to be almost run out of town after a practice of over thirty years, for his regrettable part in a fatal and fearfully mishandled confinement. That episode will be told later.

Let it be added that ven after the advent of qualified medical men, and for many years, the experienced grandmas of the village were sought after rather than any "new-chum" doctor. In fact, it is doubtful whether there was a trained maternity nurse in Gundagai before the beginning of the present century.

Among the unqualified "doctors" who carried on so long ago were Mr. Robert Davison and Mr. John Spencer. The former was a storekeeper and druggist; he built the first store in Gundagai in 1842. He was a man of integrity, whose advice and word were both accepted as gospel truth. But John Spencer, inn-keeper, was a horse of a different colour—bully, know-all, raucous, argumentative and blasphemous in speech, he rammed his opinions and his medicines (for he kept a dispensary at his inn) down the throats of all and sundry. John Spencer came to Gundagai in the year 1841, and he departed perforce in 1870, unregretted and unsung, a happy loss to a thriving township.

It was the profitable habit of Spencer gently to advertise himself, free of charge of course, by writing up his exploits under the title of "Our Own Correspondent" for the Goulburn, Yass and Sydney papers. It was, for instance, no novelty to read such a paragraph as the following from his own anonymous pen:

SOUTH GUNDAGAI

(Our Own Correspondent)

A short time since a respectable person of this neighbourhood took a strong dose of strychnine in a fit of despondency. As soon as the rash act was known a young woman in the house had the presence of mind to administer large draughts of warm salt water which produced vomitting [*sic*].

As soon as Mr. Spencer arrived, he gave vinegar and water, and shortly after, from the great depression which existed, prescribed a system of tonics. These means were happily successful, the person having quite recovered.

"Dr." Spencer had a pleasant little arrangement with the patients who could not afford his fees—his "gratis patients". This consisted in having them extol his merits, by way of a signed statement, which Spencer placed as an advertisement in the local Press. It only goes to prove that it is an ill wind indeed that cannot be made to blow in some suitable direction. For example, there was once in Gundagai a tailor named Corbett, who was more famous for his cut than his cash. He worked out his account with Spencer in the manner related, and eight insertions of the advertisement hereunder appeared in the news journal.

MEDICAL

My son, James Corbett, has been subjected to Epileptic Fits during the last five years. I consulted many medical men for him, and I gave him many of the remedies suggested to me by others, but all failed to give him any relief. He has now been CURED and restored to health by DR. SPENCER of South Gundagai.

For the information of other sufferers and thus publicly to express my thanks to Dr. Spencer I make this cure known.

James Corbett, Tailor.

It was probably as well that there were only eight insertions, as any more would have coincided with a funeral notice of the poor boy, who fell into the river in a fit.

Mr. Spencer's fees were not particularly high, just the same, as may be gathered from his regular advertisement, politely entitled "a card", and set out thus:

MR. SPENCER

Physician, Surgeon and Accoucheur

South Gundagai

Begs to inform his friends and the public that he has greatly reduced his charges, the following being his present rate of prices in all departments:

Confinements (if pre-engaged)	£2	2	0
Extracting Teeth		2	6
Bleeding		2	6
Attendance in the country, per mile ..		3	0

Diseases of A Certain Nature,

Secondary symptoms, Pains in the limbs, joints, etc. and all complaints of children quickly and efficiently cured.

Advice Gratis every morning for all diseases from 9 to 12 o'clock.

The legal position of an unqualified man demanding a fee was that he could charge for his "labour" and "materials", but he could not sue for any attendance as a "doctor" and expect to recover professional fees. This was proven by a verdict given in the case of Ah Mee *versus* Kennedy, heard at Wagga in the early seventies. Kennedy, who had been ailing, seems to have taken the prescriptions of local European doctors without deriving benefit therefrom, so he subsequently sought Celestial aid, by applying to Ah Mee, a Chinese "doctor", who administered to him medicines cunningly compounded from "crow's entrails, earthworms, human saliva and weeds unknown to British herbalists". A course of such delectable physic cured Kennedy (and the present writer denies any connexion with his unsavoury namesake), upon which Ah Mee claimed £19 for work done and materials supplied, and His Honour gave a verdict in his favour for £10.

It was as a "labourer and supplier of materials" that Spencer eventually sued the husband whose wife had died in the dreadful confinement to be detailed later—the case which caused Spencer to pack his bags and leave town.

John Spencer's precise qualifications to undertake the treatment of the public in general may best be understood by reference to yet another advertisement, this time in the Yass *Chronicle* of September 19, 1857, which sets the matter out in an extremely unboasting manner.

NOTICE

". . . Shall hoarse Fitzgerald bawl
His croaking couplets in a tavern hall,
And *I* not sing? . . ."

Mr. Spencer begs to inform the inhabitants of Binalong, Jugiong, Wagga Wagga, and Adelong, that whilst he disdains the subterfuge resorted to by some members of his profession who seek to gain a surreptitious practice by calling themselves "Surgeons, Doctors, etc.", he yet professes to treat in a professional manner any diseases to which human flesh is heir.

To bear out this assertion, Mr. Spencer points to his successful practice in this place during a period of 14 years. But for the information of the newly arrived population at Adelong Gold-field and elsewhere, he desires to state that during the ten years he was in business in Bristol as a Chemist, etc., the last seven he enjoyed the friendship of Dr. Henry Riley, M.D., one of the most clever and accomplished comparative anatomists in England, and studied under him during that period, dispensing for his "advice gratis patients", performing for him the minor operations of surgery for this class, and on leaving England received from him a written testimonial as to his ability and proficiency

which procured him the situation of surgeon in a first class ship to this country.

Mr. Spencer was, besides, assistant to two surgeons in London in large practice; and had the advantage whilst in Jamaica of seeing Hospital practice for 12 months.

A tailor and a carpenter cannot work without tools; neither can a doctor practise without drugs and chemicals; these Mr. Spencer has in quantity and variety.

When qualified medical men gradually discovered the growing and wealthy district of Gundagai and put up their plates, poor old "Dr." Spencer became almost vicious in his advertisements; a typical example, published in 1869, reads as follows:

Dr. Spencer
Physician, Surgeon, Accoucheur
South Gundagai

who has never lost a patient for the past five years, and who during that time has cured many persons that had been pronounced incurable by "legally qualified surgeons" asserts that no medical man has ever cured a patient that once removed from Dr. Spencer's care.

Let the afflicted of the surrounding districts, likewise his shallow-pated, long-eared detractors, who would deem him an egoist if he were to state that he could have cured one half of those that he has seen hurled to their graves, reflect upon these facts.

Charge for attendance, 5/- per mile by day and 10/- per mile by night. Advice gratis every morning from 9 to 12 o'clock.

John Spencer had many ups and downs in his life at Gundagai, where, in addition to wielding the knife and compounding medicine, he carried on business, at one time or another, as publican, storekeeper, miller, miner, ferry-owner, newspaper correspondent, grazier and proprietor of a tallow factory. Though his adventures in all these occupations are filled with interest, it is only his career as a surgeon that can be recited here. His greatest shock came in 1852, when his Family Hotel, stables, coaches, 20 tons of hay, above 300 bushels of oats and corn, his stock-in-trade, furniture, valuable library, dispensary—in fact everything—were washed away in the disastrous Gundagai flood of that year. Spencer was washed away too, and his exploit has been handed down to us by a traveller named Lachlan Ross, of Goulburn, who was at that time passing through Gundagai on his way to the Victorian goldfields. Lachlan Ross wrote as follows in his memoirs:

At break of day some of our party went to the river and saw in a tree, out in the stream, a man in a nude condition, working his arms and legs as if he were demented but it was quite otherwise, for he was doing this in order to keep his blood in circulation. He told them that if they would send a blackfellow to him with a gill of rum, he would swim out. A blackfellow rowed out to him in a bark canoe and the man, having tied his cash-box to the tree, lay in the bottom of the boat and was paddled safely to land. This was Mr. Spencer, the Chemist. His story was to the effect that he and twenty-four others went to Thomas Lindley's public house which was a wooden structure not far from the bank of the river. First they got on the roof but afterwards left it for the roof of a detached brick building, the kitchen, thinking that would better withstand the flood than the wooden one. But before going on the roof Mr. Spencer greased his skin well, in order to keep out the cold in case he should get into the water, tied his cash-box round his neck and left his clothes loose so that he could divest himself of them in a moment if necessary. In the night [it was midwinter!] the building gave way and the roof floated down the river with its occupants. Here and there it struck trees; at other times cattle swimming came in contact with it, and sometimes horses pawed shingles off, until at last it was so broken that all fell into the merciless water.

Mr. Spencer did not try to swim ashore; he simply floated down the stream until he got into a tree from which he was rescued. It will be seen from the above that Mr. Spencer took all possible precautions under the circumstances. Two days later when the boat came to the southern side of the river, the cash-box was taken from the tree and handed to its owner.

About eighty people were drowned in that terrible flood of the Murrumbidgee River, which swept the complete town of Gundagai away, it having been built on the river flats at that time. It was afterwards rebuilt on the adjacent mountainside. John Spencer was one of the few survivors; he had saved his precious cash-box, however, and no doubt this gave him the wherewithal to recommence business. He lived to make another fortune.

"Dr." Spencer's last professional case occurred in March, 1870, when he was called to attend a lady in the country who was in the throes of a complicated confinement. She was being attended by "a young man named Henderson", according to Spencer's account, "who had never before been employed in a midwifery case". He was another unqualified practitioner who had recently invaded Spencer's domain. Spencer refused to go unless the young man was dismissed from the case.

After a distressing and unsuccessful night spent at his patient's residence, Spencer advised the husband to summon Dr. Cobbett, M.R.C.S., a legally qualified and recently arrived practitioner of Gundagai. Dr. Coobbett eventually delivered the mother of twins, one being born dead. The mother died of septicæmia some days later.

The dead woman's husband, left with nothing but bitterness in his heart, and in an agony of remorse, refused to pay Mr. John Spencer for his attendance, and when requested personally by Spencer to pay his fee, replied: "What! pay you for killing my wife?"

The end-result was that Spencer sued the husband, whose name was Nicholls, for the fee, £5. Cross-examined, John Spencer stated that he had gone to see Mrs. Nicholls about 3 p.m. on Thursday and would have delivered her if she could have been delivered. Dr. Cobbett came next morning; he then delivered Mrs. Nicholls. Spencer had told the defendant before Dr. Cobbett came that an operation would have to be performed on his wife which might cause her death, and that he wished Dr. Cobbett called in; he did recollect a neighbour saying that it was a very serious case and that Dr. Cobbett should be called in, and he did not then say "Nonsense!" He had used the instruments he always carried with him (the plaintiff here held up his fingers) and commenced to perform the operation of craniotomy and perforated the head of the fœtus in the womb with a pair of nail-scissors. He had agreed to attend the defendant's wife for £5; he had done so, and wanted to be paid. He was not a legally qualified man, but he had practised for twenty-seven years in the locality and had always been able to recover his fees.

The plaintiff in the course of his examination showed a great desire to enter into a vindication of his treatment of the patient in question and to testify as to his general professional ability. He also produced a printed lecture from which he wished to read extracts. His Honour said that fortunately he did not feel called upon to decide upon the medical bearings of this case. What the Court had to judge was whether a special agreement had been entered into on behalf of the defendant; if he had to decide upon the medical bearings of the case he might "pronounce a very decided opinion". The plaintiff, he added, seemed to labour under a malady of entering into medical discussions, and he knew of no remedy that would effect a cure in his case. Judgement was given for the plaintiff for £2 2s.

Spencer departed from Gundagai for the "Old Country" that same year, selling all his numerous properties at South Gundagai, and was never heard of again. He tried to vindicate his actions by writing a long letter to the local paper, but his only reward was the following, under the head of "Answers to Correspondents":

John Spencer:—Yours is not a letter we desire to insert even as an advertisement, as this is not a journal for treating of medical subjects or obstetrics. The quotations you make from lectures by Mr. Tyler Smith, M.D., physician and accoucheur to St. Mary's Hospital, seem to indicate that the operation of craniotomy is properly enough performed with nail scissors, and this notice of your letter must suffice.

The writing was certainly on the wall, and Spencer could just as certainly read.

The township of South Gundagai, thriving little lesser-half of the main town of North Gundagai, remains as John Spencer's monument, for he was its founder. He built its first dwelling, its first hotel and store, and he it was who applied successfully, after many battles, to have the South Gundagai township surveyed and approved. It is possible that there may be an odd one of the many children Dr. Spencer brought into the world still tottering around the little town; but he would have a very long, grey beard, and would be very weary in the legs, for it was a long time ago.

ANATOMY IN THE MEDICAL CURRICULUM.

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IT is an inescapable fact that the earlier a subject occurs in the medical course, the greater is the number of potential critics ranged behind it. In this respect anatomy occupies a peculiarly eligible position, since it is the first subject taught to students that other medical teachers feel free to criticize. Thus anatomical teaching is exposed to the blast of the whole medical teaching world, although the bulk of criticism comes from clinicians. Here anatomy may count itself fortunate, since there is little doubt that this invigorating draught keeps the subject remarkably alive. Nevertheless, there are times when the critics are so ill-informed of what they profess to reform that their remarks become irksome. Anatomists as a class are peculiar, as will appear, and they tend to stand abashed before their clinical colleagues. However, some able writers—for example, Wood Jones,[1] Elliot Smith,[2] Le Gros Clark[3]—have attempted to explain where anatomy stands in the medical curriculum. Since their remarks appear to have passed unnoticed, it seems that the time is again ripe for anatomy to speak for itself.

The critics may, in general, be divided into two classes: those whose interests are circumscribed by the limits of a speciality, and those who sit in deliberate session to reform the medical curriculum as a whole. All agree that the course is too long and requires pruning, but what should be eliminated is harder to decide, since none is willing to diminish the importance of his own subject; so they unite in a chorus of demand for reform in pre-clinical work, especially anatomy. The anatomist could respond by declaring his subject a pure science, like zoology or chemistry, and teaching it as such. In the outcome, however, he is usually medically trained and interested, recognizes that most of his clients are destined for a medical career, pays what heed he dares to the advice of his clinical colleagues, and imparts his instruction with as much medical bias as is possible.

Criticism follows two major trends: first, that there is too much didactic instruction, with too little practical and tutorial work; and secondly, that there is too much emphasis on facts and too little on general principles, the student thus being involved in a great deal of useless detail (for example, the Royal College of Physicians report,[4] the Goodenough report[5] and others, both written and verbal). The former complaint elicits the answer that as long as students are admitted to the medical course in the immature state so common at present, they must be spoon-fed in the didactic mode—in the earlier years, at least; as a rider, let me add that the present starvation in staff and material renders any other approach out of the question. With regard to "too many facts", we may point out that anatomy is almost uniquely composed of facts and poorly endowed with general principles; and it must be admitted that some facts should be taught—if only to provide the general principles with a little substance. Incidentally, I have never known patients to suffer ill effect from treatment based on factual knowledge, even though the facts be only anatomical.

Few critics seem aware of the changes that anatomical teaching has undergone, especially in the last decade. Modern teachers regard the subject from an entirely fresh viewpoint and are fully seized of the necessity for a functional approach. As far as possible they stress the importance of study of the living, and they are as familiar as most with the value of such aids as radiography and visual education. The teacher of anatomy has no need to pad out his subject with useless detail to justify his existence; he is adequately occupied in teaching essentials in the limited time available, and loses no opportunity of eliminating material which experience shows not to be strictly necessary to the subsequent work of his students.

As applied to anatomical detail, the adjective "useless" is purely relative, referring to matter outside the interests of the critic of the moment; other critics supply quite different lists of "useless" details. The duty of the anatomist, however, is to meet the requirements of all subsequent teachers in the medical course; their collectively unlimited demands on the one hand, and lack of time on the other, render this ideal unattainable, and the result pleases nobody—least of all the anatomist. As long as the demands of clinical teachers remain so extensive, so long must anatomical teaching endeavour to meet all the claims made upon it, even at the risk of displeasing individuals. No anatomical detail is unnecessary to the present medical curriculum, and it would appear that the greatest success has attended those who knew the detail and possessed the ability to employ it.

Not uncommonly we hear the complaint that students come to some branch of clinical teaching—surgery, medicine, otology, ophthalmology *et cetera*—devoid of all pertinent anatomical knowledge. It is not generally remembered that in the intervening year or two intense concentration upon quite different subjects has submerged the originally well-learnt anatomical lore. The knowledge is still there, however, waiting to be revived, and I suggest that it is the duty of the clinical teacher of the moment to awaken those aspects upon which his speciality depends.

A different type of complaint comes from a Dr. Roberts,[6] who bemoans the fact that medical teachers tend to engage in research unrelated to the future work of their students. The falsity of this complaint is illustrated by (*inter alia*) the example of British anatomists during the late war. But even were it true, what does Dr. Roberts expect? Anatomy is vast, and its teacher is expected to be well versed, in addition, in histology, embryology and neurology, while he must have a more than nodding acquaintanceship with anthropology, comparative anatomy, cytology, genetics and half a dozen other branches of his subject. Thus, the man who is prepared to spend his life mastering this galaxy of sciences, and teaching them to students who will soon be earning many times his income, must necessarily be peculiar. And if he prefers peculiar subjects for research, his foibles must be indulged, for trained anatomists are not easily come by—they are not created by act of parliament or senatorial decree, but by a combination of personal eccentricity and many years of hard work. Further, bearing in mind the practical man's inquiry as to the value of the dynamo Michael Faraday had just invented, we may draw comfort from the knowledge that none can foretell the future clinical—or other—application of our present unpractical lines of research.

Perhaps I may assume the role of critic for a while. If so, I shall follow tradition and turn my attention first to the subjects which precede my own. This is what I think: first, that the age of entry to the medical course should be raised to eighteen years; second, that most of what is taught in the first year could well be disposed of before the student left school. This remark will raise a protest, in which the words "culture" and "values" will be prominent. I feel constrained to reply that ignorance of the sciences which have made civilized life possible betrays as much cultural defect as ignorance of letters; and no scholastic discipline owns a higher appreciation of values

than does science, whose sole criterion is truth. However, to meet any difficulties I suggest that the requirements of the school Leaving Certificate Examination be made as broad as the teaching capacity of the schools will permit, and that the present first-year medical subjects be demanded for a separate matriculation examination. This leaves school education untrammelled by special university requirements, and meets the needs of the vast majority who will not proceed to the university. But when a student has reached the stage of contemplating a university career he must also have decided upon his future vocation, and it is no hardship then to ask as prerequisites the subjects most likely to be of value to him.

I should like to air some further views on the subject. Since the aim of medical students is to study man, they should be brought into contact with that subject from the beginning of their university course. I have long maintained[7] that for biological teaching the human animal is as good an example as any other, and some years of experience have strengthened that belief. This is particularly the case if biology is taught at school; if not, then university teaching should be restricted to the establishment of an appropriate background, work on parasitology *et cetera* being reserved for the proper place in the curriculum. Further, since the medical student's real aim is to study sick people, he should have the opportunity of meeting them from the outset. Even no more than a well-organized half-day a week during two pre-clinical years would bring understanding of the application of pre-clinical teaching, and would also allow for the medical and surgical tutoring *et cetera* which occupy so much of the early clinical training. It should be unnecessary to add that these remarks do not apply to the teaching of biology and anatomy as sciences, but to their employment in the training of medical students.

This brings me to some consideration of clinical training and, since my recollections are out of date, I approach the subject with diffidence. However, emboldened by a letter from a student[8] and by a leading article in the *British Medical Journal*,[9] I would make the following points in reply to clinical critics: (*a*) while clinical teaching remains what it is, anatomy would be neglecting its duty in omitting any of its present detail; (*b*) until clinical teachers have a clear idea of the kind of medical practitioner they wish to turn out, it is impossible to introduce any radical changes in any part of the medical curriculum; (*c*) clinicians must put their house in order first—change must come from the top, not the bottom; clearly, it is useless and dangerous to tinker with foundations before deciding what kind of superstructure they have to support.

Summary.

1. The place and obligations of anatomy in the medical curriculum are discussed.

2. The following suggestions are advanced: (*a*) first-year medical subjects should be taught at school; (*b*) the age of entry should be raised to eighteen years; (*c*) human anatomy should be taught from the beginning of the university course; (*d*) medical students should have access to some clinical experience from the outset.

3. In the existing medical curriculum, none of the present anatomical teaching is redundant.

4. No reform will be achieved in medical teaching until clinicians agree upon the type of practitioner they wish to produce.

5. Therefore, reform must start at the top, not the bottom, of the medical curriculum.

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PLASMA PROTEIN ESTIMATIONS IN BATTLE CASUALTIES.

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WITH the introduction of the falling-drop method by Barbour, Hamilton, Van Slyke, Phillips *et alii*, plasma protein estimation has become a procedure which requires no special apparatus and which may be rapidly and easily performed. Thus instead of being a method used occasionally in large institutions, plasma protein estimation is now readily available in small field units. Even so, there have been singularly few references to its use in battle casualties and for this reason it was thought that a brief presentation of the results in some selected cases might be of interest.

The urgent necessity of restoring to normal the blood volume and plasma protein content in cases of burns is now widely recognized, and in other conditions such as intestinal obstruction and peritonitis this is also being appreciated. However, in cases of severe trauma without overt hæmorrhage, the extent of the hæmorrhage and progressive exudation of protein into the tissues has often been under-estimated and inadequately treated. Concealed hæmorrhage following trauma is best exemplified by those cases of fractured femur in which the extreme shock which develops is sometimes regarded as neurogenic in origin, whereas in reality it is for the most part the result of a rapid spilling of blood into the tissues of the thigh. (It is mainly because of acute anæmia that fractures of both femora have such a high mortality rate). Similarly, in the case of many other injuries an autopsy will reveal a hæmorrhage into the tissues of unsuspected magnitude. In burns there is a profuse exudation of protein-containing fluid into the tissues, but because of the exudation of a similar fluid onto the surface of the body, the correct treatment is apparent and is usually employed. Considerable exudation of protein-containing fluid into the tissues also follows trauma; but often it is only after an interval that the progressive protein deficiency becomes obvious on clinical examination. Studies of the nitrogen balance reveal considerable loss in all cases of major injuries. Serial hæmoglobin and plasma protein estimations are especially necessary for patients who have received three or more litres of stored blood, in order that the subsequent destruction of the transfused blood may not pass unrecognized.

When the plasma protein level reaches a critical point (usually 5·0 to 5·2 gramme per 100 millilitres), œdema of the tissues may develop owing to the alteration in the osmotic pressure of the plasma. An example of this is the œdema of starvation. It will be immediately realized that such osmotic pressure changes in vital tissues may lead to permanent damage, especially if combined with anoxia and impairment of the circulation. Although they do not cause widespread œdema, lesser degrees of hypoproteinæmia interfere with the fluid balance of the tissues and may be a factor in the production of œdema localized to the site of the trauma. This local œdema is especially noticed when it occurs about an intestinal anastomosis. Apart from the osmotic pressure effects, hypoproteinæmia has been shown to be a cause of impaired healing of wounds, of lowered resistance to infection, of gastro-

intestinal dysfunction and of susceptibility to shock. It is probably also related to the development of gastro-intestinal and cutaneous ulcers. In addition to the initial loss of protein into the tissues immediately after an injury, there is a continued loss both into the tissues and onto the surface until the wound is covered with epithelium.

The chief general factors responsible for protein deficiency are an increased protein output in the urine,

TABLE I.

Case Number.	Diagnosis.	Time Lag in Hours[1].	Treatment.	Days Since Admission.	Intake.[2] Blood.	Intake.[2] Serum.	Intake.[2] Glucose and Saline Solution.[3]	Intake.[2] Fluids by Mouth.	Output.[2] Vomitus.[4]	Output.[2] Urine.	Specific Gravity of Blood.	Specific Gravity of Plasma.	Plasma Proteins. (Grammes *per Centum*.)	Hæmoglobin Value. (Grammes *per Centum*.)	Hæmatocrit Reading. (Percentage)	Remarks.
I	Perforating shell wound, right tibia. Gross destruction of muscles of calf.	3	Wound excised, anterior tibial vessels ligated, plaster of Paris applied.	1				15		0	1,056[5]	1,028	7·15	13·6	40	Initial fall and slow recovery of plasma protein without intravenous infusions.
				3				145		48	1,049	1,022	5·15	12·1	36	
				5				62		43	1,048	1,022	5·15	11·9	35	
				8				95		73	1,052	1,023	5·45	13·3	39	
II	Penetrating machine-gun wound of right thigh. Fractured ilium.	3	Wound excised, bullet recovered.	1				40	16	0	1,054[5]	1,024	5·85	13·7	40	Wound became infected. Falling plasma protein level without intravenous therapy.
				2				62	11	40	1,055	1,025	6·15	14·1	41	
				4				102		44	1,050	1,024	5·85	12·2	36	
				12				116		76	1,048	1,023	5·45	11·5	34	
				15				87		55	1,048	1,023	5·45	11·5	34	
III	Perforating rifle wound of chest wall. Right *pectoralis major* destroyed.	20	Wound excised.	1	33			30		10	1,050[5]	1,025	6·15	11·8[6]	35	Initial transfusion prevented a gross fall in the plasma protein level.
				2				85		35	1,051	1,026	6·50	11·8	35	
				4				74		48	1,051	1,025	6·15	12·2	36	
				5				78		43	1,052	1,024	5·85	13·0	38	
				6				96		51	1,050	1,024	5·85	12·2	35	
IV	Penetrating machine-gun wound of both legs. Gross comminution of right tibia and fibula. Extensive muscle damage.	12	Wound excised, right posterior tibial vessels ligated, plaster of Paris applied to right leg.	1	33	33		0		0	1,047[5]	1,022	5·15	11·4	33	General condition poor, but improved slowly. Poor appetite. Note the difficulty in overcoming the hypoproteinæmia — due to sepsis. The anæmia also proved refractory.
				2	33	33		58		25	1,047	1,022	5·15	11·4	33	
				4	27	33		72		49	1,043	1,022	5·15	9·6	28	
				6	20			121		78	1,045	1,024	5·85	10·0	29	
				7				98		57	1,049	1,024	5·85	11·7	34	
				11				113		40	1,047	1,024	5·85	10·8	32	
				19				108		46	1,046	1,022	5·15	11·0	32	
				21	20			90		53	1,048	1,024	5·85	11·2	33	
				23				104		60	1,048	1,024	5·85	11·2	33	
V	Penetrating mortar wound of left thigh. Lacerated femoral vein.	7	Wounds excised, femoral vein repaired, missile recovered.	1	66	33		0		0	1,058[5]	1,028	7·15	14·7	44	Initial blood findings normal, although a profuse acute hæmorrhage occurred.
				2				75		41	1,052	1,024	5·85	13·0	39	
				3				100		37	1,051	1,024	5·85	12·4	37	
				10				86		59	1,049	1,025	6·15	11·4	33	
VI	Avulsion of left buttock, hæmatoma of loin containing 40 ounces of blood.	7	Wounds excised, gluteal vessels ligated, 54,000 units of gas - gangrene antitoxin.	1	66	60		0		5	1,045[5]	1,022	5·15	10·6	31	Profuse seropurulent discharge. Note the oliguria and the poor response to treatment. Death due to *Clostridium welchii* infection.
				1	33						1,047[6]	1,022	5·15	11·3	33	
				2	33			56		15	1,045	1,023	5·45	10·2	30	
				3				42	16	8	1,042	1,022	5·15	9·0	26	
				4	33		33	78	6	7	1,044	1,024	5·85	9·2	27	
				5	20		33	30		4	1,044	1,026	6·50	8·6	25	
				5							1,044	1,023	5·45	9·3	28	
				6	20	16	66	17		5	1,039	1,020	4·45	8·4	25	
VII	Penetrating rifle wound of forehead, *Fungus cerebri*.	144	Wound incised and pus evacuated, repeated lumbar punctures, missile not recovered.		20	46										Transfusion given prior to admission. Urinary incontinence. Slight improvement in general condition.
				1		33	33	0		0	1,058[5]	1,027	6·80	14·9	44	
				2			33	89		?	1,058	1,028	7·15	14·6	43	
				3				113		?	1,056	1,026	6·50	14·2	42	
				4				152		?	1,054	1,026	6·50	13·4	40	
				6				122		?	1,060	1,026	6·50	16·0	47	
				8				94		?	1,053	1,024	5·85	13·5	40	
VIII	Shell wounds of buttock and left iliac fossa, fracture of left ilium.	17	Wounds excised, bruised omentum removed, repair of abdominal wall.	1	99	33		0		0	1,049[5]	1,024	5·85	11·5	34	Profuse seropurulent discharge. Appetite poor. General condition poor, but improving.
				2	33	33	20	145		66	1,050	1,022	5·15	12·7	38	
				2							1,050	1,024	5·85	12·2	36	
				3				102		43	1,052	1,024	5·85	13·0	39	
				7		33		151		45	1,047	1,022	5·15	11·3	33	
				9	22			91		38	1,051	1,024	5·85	12·4	37	
				16				113		57	1,049	1,023	5·45	11·9	35	
				21				88		60	1,049	1,023	5·45	11·9	35	
IX	Penetrating shell wound of left kidney and sigmoid colon.	9	Wound excised, nephrectomy, colon exteriorized, missile recovered.	1	66			10		12	1,052[5]	1,023	5·45	13·3	40	Thirty ounces of blood in perirenal tissues. Uneventful convalescence.
				1							1,050[6]	1,024	5·85	12·2	36	
				2		33		35		30	1,054	1,024	5·85	14·0	41	
				3			66	47		34	1,051	1,024	5·85	12·4	37	
X	Grenade wounds of abdomen and left arm, three perforations of jejunum, acute peritonitis.	24	Wounds excised, laparotomy, perforations oversewn. Jejunostomy — tube removed after nine days. Gastric suction for four days. Missile recovered. Intraperitoneal administration of sulphamerazine.	1	33	33		0		0	1,055[5]	1,022	5·15	15·0	45	Slight infection of the wounds. Toxic condition subsided after four days, and thereafter the condition steadily improved.
				1							1,054[6]	1,027	6·80	13·1	39	
				2		33	33	43	10	24	1,052	1,024	5·85	13·0	38	
				2							1,048	1,025	6·15	11·0	32	
				3	53	63	90	59	75	59	1,047	1,022	5·15	11·4	33	
				3							1,049	1,024	5·85	11·7	34	
				4	20	33	33	64	79	63	1,048	1,024	5·85	11·2	33	
				4							1,047	1,024	5·85	10·8	32	
				5		33	53	73	60	44	1,051	1,024	5·85	12·5	37	
				6				100	20	35	1,051	1,025	6·15	12·4	36	
				7				116		46	1,051	1,023	5·45	12·8	38	
				9				79		45	1,051	1,024	5·85	12·5	37	
				13				139		75	1,053	1,026	6·50	12·8	38	
				17				115		80	1,048	1,025	6·15	11·0	32	
				22				98		66	1,051	1,026	6·50	11·9	35	

[1] Time lag between receipt of wound and admission to hospital.
[2] Figures are given in ounces.
[3] Glucose, 5%, in normal saline solution, glucose, 4%, in fifth normal saline solution, and normal saline solution.
[4] Including fluids removed by gastric suction.
[5] Before operation.
[6] After operation.

TABLE I.—*Continued.*

Case Number.	Diagnosis.	Time Lag in Hours[1]	Treatment.	Days Since Admission.	Intake.[2] Blood.	Intake.[2] Serum.	Intake.[2] Glucose and Saline Solution.[3]	Intake.[2] Fluids by Mouth.	Output.[2] Vomitus.[4]	Output.[2] Urine.	Specific Gravity of Blood.	Specific Gravity of Plasma.	Plasma Proteins. (Grammes per Centum.)	Hæmoglobin Value. (Grammes per Centum.)	Hæmatocrit Reading. (Percentage.)	Remarks.
XI	Perforating machine-gun wound of jejunum, sigmoid colon and bladder.	7	Wounds excised, sigmoid colon exteriorized, two feet of jejunum resected, bladder repaired, suprapubic cystostomy, gastric suction, intraperitoneal administration of sulphamerazine.	1	33	50		0		0	1,054[5]	1,024	5·85	14·0	41	Acute peritonitis and paralytic ileus developed. Note extreme hypoproteinæmia on the second day. Death on the sixth day.
				2	66	56		140	112	40	1,052	1,023	5·45	13·2	39	
				2							1,050	1,021	4·80	13·0	38	
				3		33	66	123	149	36	1,049	1,024	5·85	11·5	34	
				3							1,048	1,024	5·85	11·2	33	
				4		66	33	140	138	42	1,048	1,024	5·85	11·2	33	
				4							1,046	1,024	5·85	10·3	31	
				5		66	50	92	128	71	1,048	1,024	5·85	11·2	33	
				5							1,047	1,023	5·45	11·0	32	
				6		33	33	92	36	16	1,048	1,023	5·45	11·4	33	
XII	Perforating machine-gun wound of left lower quadrant of chest, two sucking wounds.	4	Wounds excised and sutured, repeated thoracic paracentesis.	1				27		0	1,050[5]	1,025	6·15	11·8	35	Total of 29 ounces of blood aspirated from chest. Slow response to transfusion.
				3				94		45	1,045	1,023	5·45	10·2	30	
				5	20			103		33	1,044	1,024	5·85	9·3	27	
				8	20			86		50	1,044	1,022	5·15	10·0	29	
				10	20			90		29	1,045	1,022	5·15	10·5	31	
				11				128		46	1,048	1,023	5·45	11·6	33	
XIII	Perforating rifle wound of right side of the chest and right arm.	6	Wounds excised, repeated thoracic paracentesis, thoracotomy on the eighth day.	1				0		0	1,052[5]	1,026	6·50	12·4	34	Forty ounces of blood clot removed from chest at operation. General condition good.
				3	33			75		40	1,043	1,022	5·15	9·6	28	
				8				44		29	1,049	1,024	5·85	11·6	34	
				10	33			92		21	1,052	1,024	5·85	13·0	39	
				12				164		81	1,057	1,024	5·85	15·4	46	
				15		33		102		52	1,052	1,023	5·45	13·3	39	

[1] Time lag between receipt of wound and admission to hospital.
[2] Figures are given in ounces.
[3] Glucose, 5%, in normal saline solution, glucose, 4%, in fifth normal saline solution, and normal saline solution.
[4] Including fluids removed by gastric suction.
[5] Before operation.
[6] After operation.

catabolic changes in the tissues accompanying trauma or infection, and a deficient protein intake. The last-mentioned may result from insufficient food, loss of appetite, vomiting, diarrhœa and impaired intestinal absorption. To these must be added the enforced starvation in the immediate post-operative period, especially if the patient is subjected to continuous gastric suction. The progressive loss and destruction of protein are especially pronounced in the presence of sepsis. If the caloric requirements of the body are not otherwise supplied, protein will be mobilized from the liver and the tissues to make up this deficiency. In Bougainville where these tests were performed there is a high incidence of hookworm infestation; but this is usually a subclinical infestation without significant changes in the blood. In these patients it was also not possible to determine the presence or absence of hypoproteinæmia before receipt of a wound; but hypoproteinæmia was rarely seen in other patients in that area.

Method and Results.

In Table I the results of 90 plasma protein estimations are presented. These tests were carried out on recently wounded soldiers admitted to the care of an advanced surgical team. The copper-sulphate falling-drop method was used. Since the application of a tourniquet causes hæmoconcentration after a minute, its use was avoided as far as possible. A mixture of ammonium oxalate and potassium oxalate was used as the anticoagulant. From the specific gravity of the blood and plasma, the hæmoglobin value, plasma protein content and hæmatocrit values were estimated on a line chart. This method gives the hæmoglobin value correct to within 5%; but it is less accurate if there is a preexisting hypochromic anæmia. The normal range for the plasma protein content was taken as 6·5 to 7·5 grammes per 100 millilitres and for the hæmatocrit reading as 40% to 45%.

The hypoproteinæmia following trauma and the changes produced by treatment are shown in Table I. From the practical point of view it will be seen that the plasma protein and hæmoglobin estimations were of considerable help in determining the types and the amounts of fluids required, and in avoiding overloading of the circulation. Facilities for estimating the blood volume were not available, and it must be remembered that in their absence occasionally the results of plasma protein and hæmoglobin estimations may be somewhat misleading.

In addition to the treatment outlined in Table I, all patients received an injection of tetanus toxoid and intramuscular injections of 15,000 units of penicillin every three hours; the total dosage of the last-mentioned given before evacuation to the casualty clearing station varied from 390,000 to 1,350,000 units. All wounds were dusted with penicillin and sulphanilamide powder, and "Vaseline" gauze was applied. It was not possible to retain the patients till the wounds were healed, and thus there was no opportunity to correlate the degree of hypoproteinæmia with delayed healing of the wounds. However, the rate of healing appeared to be delayed in the presence of gross hypoproteinæmia.

It has been shown repeatedly that after an acute hæmorrhage in a healthy person the body is able to maintain a normal systolic blood pressure for some time, and there may even be a transient hypertension. Case V, in which there was a severe hæmorrhage from a lacerated femoral vein, illustrated this point, for the initial blood pressure was 150 millimetres of mercury, systolic, and 80 millimetres, diastolic, at the time of the patient's admission to the care of the surgical team. This case also shows the value of blood transfusion, even though the blood pressure and hæmoglobin values have not yet fallen below normal limits. Dehydration due to profuse swelling or other causes may conceal anæmia or hypoproteinæmia; but in such a case there is usually some clinical evidence of dehydration, and the blood volume is reduced. Whole blood is the fluid of choice for immediate transfusion under these conditions. In Case VII (*fungus cerebri*), although the patient was suffering from dehydration on his admission to hospital, it was thought advisable to limit the intravenous infusions.

In Case VI a profuse hæmorrhage had occurred from the gluteal vessels. When the patient was admitted to hospital six hours later, his systolic blood pressure was

50 millimetres of mercury and his diastolic pressure 20. The pressures had probably been at those levels for some hours, and it was another two hours before they increased to 100 millimetres of mercury, systolic, and 62 millimetres, diastolic. After such prolonged anoxæmia it was only to be expected that irreparable damage of vital structures would have occurred. This was borne out, for he did not completely regain consciousness although the lost blood was replaced and the circulation restored. The prolonged anoxæmia was almost certainly also a factor in the development of the anaerobic infection.

In Case VIII similarly a large hæmorrhage had occurred; but fortunately an adequate circulation had been maintained, and vital structures escaped damage.

The normal daily requirements of nitrogen are supplied by one gramme of protein per kilogram of body weight. This is contained in a normal diet; but if the diet is inadequate the extra amount of protein required may be estimated and given as blood or serum, which contain 180 and 70 grammes per litre respectively. Up to five grammes of protein per kilogram of body weight per day may be required in the presence of severe burns.

Albumin and amino acid preparations suitable for intravenous injections are now on the market, but are not universally available. The amino acids have the advantage that synthesis of proteins in the tissues may occur without the preliminary breakdown of other proteins. However, amino acids are not so efficient as serum or blood in combating shock and acute hypoproteinæmia. Concentrated serum was used when it was desired to increase the protein intake by intravenous injection, while, at the same time limiting the fluid intake. Concentrated serum is prepared from dried serum, and up to four times the normal strength was used.

While the body possesses mechanisms for immediately coping with hypoglycæmia and other deficiencies, in the absence of treatment hypoproteinæmia is overcome by the body only after some days, and it is for this reason that supportive measures are necessary.

Summary.

The results of serial plasma protein estimations in selected battle casualties are presented and briefly discussed. The presence of hypoproteinæmia in seriously injured battle casualties is demonstrated.

Acknowledgement.

My sincere thanks are due to Sergeant B. Thayer for his technical assistance. The DirectorGeenral of Medical Services has kindly given permission for the publication of this paper.

Reviews.

INTESTINAL OBSTRUCTION.

MUCH work has been done on intestinal obstruction, and yet there is lack of appreciation of the basic principles of its treatment on the part of many surgeons. In a recent publication, J. T. Chesterman has described these with great clarity and common sense.[1] The author has had the opportunity in England not only of treating many sufferers from this condition, but also of being associated with American experts in it. Despite all this experience and knowledge, the book contains only little more than 100 pages and is a thin, handy publication. Surgeons, both old and young, are strongly recommended to obtain it and to read it carefully. It contains no radical doctrine and yet omits nothing which the most recent research may have taught us.

[1] "The Treatment of Acute Intestinal Obstruction", by Judson T. Chesterman, M.R.C.P. (London), F.R.C.S. (England), F.A.C.S.; 1945. London: J. and A. Churchill Limited. 8¼" × 5¼", pp. 124. Price: 10s. 6d.

The book is in two parts. The first deals mainly with pathology and treatment along general lines, the second with the pathology and treatment of special types of obstruction. The first part reaches a higher standard than the second, the latter being a difficult one from the point of view of maintenance of balance and continuity.

One or two points in the discussion of pathology may not find universal agreement. All may not believe that the caecum is narrower than the sigmoid colon; yet it is stated in this section that the resistance of the bowel wall to bursting is proportional to the diameter of the lumen, and for this reason the pelvic colon withstands increases of intraluminal pressure better than the caecum. In the absence of proof the author does not make emphatic statements, for example, he suggests rather than states definitely that no toxic absorption is responsible for the condition of the patient in intestinal obstruction.

We cannot agree that in acute primary strangulation of the small intestine retrograde venous thrombosis is the primary cause of distension, either proximal or distal to an acutely strangulated loop, and that if the process extends more on the distal than on the proximal side, more dilatation is found distal to the obstruction. It is known, of course, that varied degrees of venous thrombosis occur in several types of lesion, but to describe it as the cause of distension (misspelt on page 7) is hardly in accordance with what can be observed. No mention is made of the indirect effects of fluid loss, nor is the importance of chloride loss given due emphasis.

In spite of disagreeing on one or two points, we cannot help admiring the clarity and simplicity with which the salient features are presented and the judgement exercised in stressing proportionately to their importance various points in diagnosis and treatment. The pathology of relief, for example, has not occupied the minds of surgeons sufficiently in the past. However, in aiming at clarity, the author has made certain hard and fast rules, for example, in determining which patients should be treated conservatively, that is, by suction and intravenous therapy alone (page 28). There is a danger here. Each case shows some peculiarity and variation which cannot be anticipated.

Treatment by suction, both gastric and intestinal, is described in a practical manner and with due emphasis on difficulties. Each surgeon differs from others in the manner in which he passes a Miller-Abbott tube into the duodenum. All cannot do it in the manner here described. It has been noticed that in America a gastric and an intestinal tube are used at the one time. This hardly seems necessary. Again, another surgeon is quoted as doubting the efficacy of oral feeding when a Miller-Abbott tube is in the intestine. There is not the slightest reason why this should not be of benefit, since each loop of small bowel evacuated and decompressed often acts normally both from a motor digestive and absorption point of view.

Honesty of opinion is an outstanding virtue in this volume, and we are interested to note that this experienced surgeon has never seen a patient, on whom an enterostomy had to be performed for intestinal obstruction, leave hospital alive. Amid the plethora of new ideas one notices with approval in regard to anæsthesia that ether administered on a mask is regarded as highly suitable for these cases.

It is unnecessary to comment in detail on the second part of the book which is composed of many small sections. It is a succinct *résumé* of much theoretical and practical knowledge of many types of intestinal obstruction.

In the treatment of neglected strangulation of femoral herniæ an operation is described in which not only is the hernia attacked directly, but intraabdominal manipulation through a paramedian incision is carried out. It seems certain that there are in this category many patients who would not stand this and who tolerate nothing more than a direct attack under local anæsthesia. In a book as small as this it seems unnecessary to have mentioned some extremely rare and unlikely types of obstruction. We disagree on two additional minor points in the description of hernia through a hiatus in the mesentery or mesocolon. Mention is made of the pressure exerted by the small bowel during its extrusion into and return from the umbilical cord in the early weeks of fœtal life. Such pressure rarely, if ever, occurs during development. Changes of position are usually due to differences in growth rates. In discussing neurogenic ileus the author states that the early stages are associated with colic pain of less severity than in simple mechanical obstruction. This occurs only in a very small proportion of cases.

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AN INSTITUTE OF MEDICAL RESEARCH FOR QUEENSLAND.

THE decision of the Government of Queensland to establish an institute of medical research and the passage of an act by the Parliament of Queensland to give effect to the decision are events that should be made known through the length and breadth of the Commonwealth. The Commonwealth Government, through the National Health and Medical Research Council, spends something like £30,000 a year in grants to medical research workers. The Government of Queensland has recognized the value of research in medicine and proposes to spend every year a sum of money equal to that expended by the Commonwealth Government. The way in which this new move was brought about has been learned from speeches made by the Honourable T. A. Foley, Secretary for Health and Home Affairs, on the Queensland Institute of Medical Research Bill and reported in *Hansard*. Mr. Foley said that he recognized that there was no standing still in scientific development, but that research work had to continue. The bill that he was introducing was the first shot in the new war, the war against disease in Queensland. On behalf of the Government he had asked Dr. E. H. Derrick, of the Department of Health and Home Affairs, how to approach the question of the extension of medical research in Queensland. On November 17, 1944, Dr. Derrick submitted a report containing two sets of recommendations —plans for immediate implementation, and plans to be developed during the post-war period. The first set of plans recommended the appointment of a Medical Research Advisory Committee whose functions would be to plan an institute of medical research and to advise how the scheme could be carried out step by step. A committee was eventually appointed by the Government and consisted of Dr. E. H. Derrick, Dr. A. Fryberg, Mr. H. W. H. Marley (accountant of the Department of Health and Home Affairs), Mr. A. J. Anderson (of the Brisbane and South Coast Hospitals Board), Professor J. V. Duhig, Professor D. H. K. Lee, Dr. Alex Murphy, Dr. S. Julius and Dr. G. C. Taylor. Mr. Foley said that the committee entered very enthusiastically upon the work entrusted to them and he expressed his appreciation of their "very fine contribution" to the completion of the scheme. Mr. Foley admitted that not all the recommendations of the advisory committee had been adopted, since some of them conflicted with Government policy. Since so many of the decisions made are very satisfactory, it would be interesting to know what recommendations were not accepted. Cabinet has decided that the director shall be the key man of the institute, that a salary of £2,000 *per annum* shall be offered for the post, that the director shall have adequate periods of leave so that he may visit other research institutes, that his travelling expenses shall be paid for him, that he shall be appointed for a period of seven years and be eligible for reappointment. The director is to be appointed as soon as possible so that he may superintend the development of the institute from the outset. It has also been determined that he shall not be overloaded with administrative duties, but that he shall be free to superintend the research staff and undertake research work on his own account. The central establishment of the institute is to be in the grounds of the Brisbane Hospital. If possible it will be housed in the same block as the pathological department of the Brisbane Hospital. By this means it is hoped that the institute will be brought into close touch with medical problems awaiting solution and that it will have available the necessary clinical and pathological material. In the close relationship that is to be sought between the institute and the pathological department of the hospital, it is intended that the latter will carry out routine procedures required by the former and that the institute will provide for investigation on problems of research when required by the hospital. This is, on paper, an ideal arrangement. Whether it will be workable will depend on the ability of the director of the institute and the head of the pathological department to work in amity and without an undue desire for personal recognition. The Brisbane and South Coast Hospitals Board is to be asked to give to the director of the institute and the senior members of its research staff such status in the hospital as will give them access to patients when necessary; a request will also be made for the allotment of beds when they are needed for the carrying out of clinical research. On the clinical side this leaves little to be desired. Mr. Foley has not forgotten the academic side, for he has declared himself in favour of the principle that research and teaching shall be closely related. To this end negotiations will take place between the council of the institute and the University of Queensland.

Turning to the Act, *The Queensland Institute of Medical Research Act* of 1945, to give it its proper title, we note that the institute is established for the purpose of research into any branch or branches of medical science. The following special matters, however, are named: (*a*) Queensland fevers, including "Q" fever, scrub typhus and leptospirosis; (*b*) lead poisoning, problems of diagnosis and after-effects, and particularly as affecting the health and well-being of the children of the State; (*c*) virus diseases, presence of pathogenic viruses, particularly in relation to children; (*d*) the effect on health of industrial processes and industrial diseases generally; (*e*) the incidence of disease in relation to social and nutritional status; (*f*) the incidence of disease in relation to

geographical districts and climatic influences in Queensland; (*g*) certain tropical diseases in North Queensland. The institute is to have power to formulate an active programme of clinical research. It will be under the control of the "Council of the Queensland Institute of Medical Research" and this is to be a corporate body. It will consist of seven members as follows: (*a*) the Director-General of Health and Medical Services (who shall be *ex officio* a member of the Council and its chairman); (*b*) a member nominated by the Minister to represent the Government; (*c*) a member nominated by the Minister to represent the Department of Health and Home Affairs; (*d*) a member nominated by the Senate of the University of Queensland "having regard to the advice of the Faculty of Medicine"; (*e*) a member nominated by the Brisbane and South Coast Hospitals Board; (*f*) a member nominated by the controlling body of the Mater Misericordiæ Hospitals; (*g*) a member nominated by the Queensland Branch of the British Medical Association. The six members other than the chairman are to be appointed by the Governor-in-Council.

The Government of Queensland has shown wisdom in deciding to establish medical research within its borders. In one sense it supplies a need which has already been met in other States, chiefly by private endowment. In another sense it has furnished an example to some of the other States in which due recognition has not been given by governments to the value of research. Having shown wisdom to this extent, it will, we may hope, not display foolishness in its expectation of spectacular results. In our discussions on research we have never failed to emphasize the fact that as a rule advances in knowledge come slowly and by a summation of many results rather than by one planned and isolated investigation. A great deal will depend on the choice of a director and also on the personnel of the controlling council. The members chosen should have some knowledge and also some experience of research and its difficulties. As the institute is to deal with medical research, as many members of the council as possible should have a medical qualification. The Minister was careful in the first instance to obtain expert advice; he is scarcely likely to jeopardize the success of this necessary and praiseworthy venture by the neglect of similar precautions in the final or launching stage.

Current Comment.

HEART SOUNDS IN HEALTH.

IT has been the great good fortune of service medical officers to have the opportunity to examine large numbers of healthy young men in the processes of enlistment and discharge. Though some regrettably fail to find interest in "normal" subjects and gain nothing from them, the keen observer culls much of value and interest from the task. Probably the heart sounds provide the most interesting part of the examination; there arise the assessment of the significance or more often the insignificance of an apical systolic murmur, the noting of variation in the nature of the first heart sound at the apex, the interpretation of the varying murmurs in the second left intercostal space. These are perhaps the problems arising from variations of the normal most often heard in health. Myer Solis-Cohen has recently discussed a less commonly known sound, though his report indicates that it is less well known because it is more often overlooked rather than because it does not often occur.[1] He calls it "the xiphisternal crunch". It is a sound heard in the region of and to the left of the lower part of the sternum and ensiform cartilage. Though the sound is mentioned in few text-books, it has been referred to many times in medical literature, and the author draws attention to no less than sixty-one writers who have made significant reference to a sound heard in this area. Among them are such famous observers as Laennec, who wrote of a buzzing at the lower end of the sternum and to a metallic click and to a creak which formerly he had mistaken for a sign of peritonitis; Osler, who mentions a peculiar and remarkable crunching sound heard as he moved his stethoscope from the apex to the sternum, and of a little grating sound at the apex; Mackenzie, who found incompetence of the tricuspid valve so common that he was inclined to look upon the valves as being barely able to close the orifice perfectly; Fishberg, who referred to a not uncommon crunching sound which is confused with the murmur of relative tricuspid insufficiency. Solis-Cohen also records the very varied descriptions of the sound given by different writers. The terms most commonly used to indicate the character of the sound are a crunch, a rubbing, scraping, scratching, click, tinkling, murmur and friction, and a number of writers have noted that it sounds superficial. The sound usually accompanies systole, and may be increased by leaning foward, excitement or exercise. It may diminish or disappear on lying down. The cause of the sound is unknown, but it has been regarded by various writers as arising from the endocardium, cardiac muscle, pericardium, or tissues in the mediastinum or between the pericardium and chest wall, or from movement of air in the lungs caused by the heart's action.

Solis-Cohen tried to determine the incidence of the sound in almost five thousand consecutive examinations of service inductees. He heard it in about one-fifth of them, but admits that in almost half of these it "was slight and might easily be missed by one not accustomed to the sound". It was heard over the sternum and ensiform cartilage, and in four-fifths to the left of these structures, as far to the left as the mid-precordium in onetenth. It was regarded as being of no pathological significance. When slight it is probably of no clinical significance, but when marked might readily cause concern to the observer unfamiliar with it. Solis-Cohen is to be commended for making use of the healthy material he has seen. His example may well be copied by other people. The interest and value of the examination of a normal subject depend on the curiosity and keenness with which it is approached.

ANNALS OF THE MONTEVIDEO FACULTY OF MEDICINE.

IBERO-AMERICAN medical research has lately undergone a decided change. Formerly the inspiration was obviously of German origin, but the imitation was rarely successful; now the medical schools of the several republics have found their feet and are operating spontaneously and without outside patronage or nurture; if any influence is occasionally detectable, it is that of the United States of America. The Medical Faculty of Uruguay, the smallest of the South American republics, publishes its *Anales* in journal form, and this reached its thirtieth volume in 1945, the latest issue to hand consisting of numbers 5, 6, 7 and 8, and containing some 300 well-printed pages. The subjects dealt with naturally vary within wide limits. There is one article on the micromorphology and microchemistry of the nuclei and nucleoli of large nerve cells; there is an excellent critical comparison of the several technical procedures for displaying the fine structure of trypanosomes; there is an inaugural lecture of a professor of clinical surgery; also the detail of the organization of the Institute of Radiology. Two contributions may be given special mention, as they illustrate both the weakness and the

[1] *The American Journal of the Medical Sciences*, September, 1945.

strength of this new independence. "*Las Algias del Talon en los Urinarios*" gives a clinical picture of a condition marked by paroxysms of burning or prickling heat felt in the plantar regions innervated from the fifth lumbar and the first sacral segments. The authors regard this as a "reflex" arising from the neck of the bladder, and most of the patients described are elderly men with prostatic hypertrophy. It is claimed that sympathetic innervation plays a part in this curious "reflex", but the nerve mechanisms put forward are not convincing. What strikes the critical reader as a singular omission is that no proper clinical histories are furnished, nor apparently have pathological diagnostic methods been adopted. There is no mention, for example, of the presence or absence of alcoholism, which, as is well known, sometimes gives a burning sensation in the feet; nor are Wassermann findings announced. The article in fact is of second-rate quality.

In a very different category must be placed a doctorate thesis of 183 pages entitled "*La Encefalografia por la Via Suboccipital*". It would have been better had the term "*Neumoencefalografia*" been adopted on account of the emphasis placed today on electroencephalography. No doubt some of the faults of doctorate theses in general are present, but they are not irritatingly obtrusive. The article opens with the technique of the puncture and the injection and then the radiological methods applied. Then comes a masterly description of the *cisterna magna*, the *cisterna pontis*, the *cisterna interpeduncularis* and other cisternæ and subarachnoid spaces in general, and then the ventricular system in full detail. The circulation of the cerebro-spinal fluid has some well-illustrated pages to itself. To one who is not a specialist in this technique the number of brain conditions which lend themselves to pneumo-encephalography must appear surprisingly large—tumours of all types and sites, atrophies and sclerosed states, and of course traumata. It is almost a relief to find the author, Hugo E. Malosetti, frankly confessing that in cases of imbecility and idiocy, epilepsy without gross lesion, many pyramidal and extrapyramidal degeneracies, and in certain syphilitic conditions, he could find no departures from normal of any moment. Pneumo-encephalography in itself has no serious sequelæ, and indeed betterment has occasionally followed. The suggestion that such can be ascribed to the breaking down of adhesions is critically discussed. An editorial note tells us that considerations of space prevented a number of X-ray photographs from being reproduced. Fortunately the many which are given are of high quality. This admirable publication should bring home to us the need for the establishment of relationships between Australian medical schools and those of Ibero-America.

AMŒBIC PERICARDITIS.

INVOLVEMENT of the pericardium is rare in amœbiasis, and this alone is sufficient reason to draw attention to the case recently reported by F. Kern, junior.[1] The patient was a seventeen-year-old Negro. For three months prior to admission to hospital he had suffered from intermittent pain in the right shoulder, malaise and progressive loss of appetite and weight. For two months he had had pain in the lumbar region, at first in the mid-line, but soon spreading to the flanks, being particularly severe in the left. For three weeks he had had fever and profuse night sweats, and occasionally pain in both sides of the chest, but no cough. For a week there had been pain in the umbilical region and sharp pain in the left flank radiating towards the left axilla. There was no history of diarrhœa. The patient was gravely ill. The temperature and pulse rate were elevated and the blood pressure was low. Examination showed that the heart was slightly enlarged to the left, with a loud pleuro-pericardial friction rub and a thrill over the lower left side of the precordium. A few rales were heard over the bases of both lungs, especially the right. There was tenderness in both flanks and costo-vertebral angles, especially the left. The liver was palpated four fingers' breadth below the costal margin, but was not tender. Blood examination revealed a neutrophile leucocytosis and mild anæmia, the blood sedimentation rate was considerably raised, and a tuberculin test gave a positive reaction. Examination of the urine, cultural examination of the blood, the Kahn test, X-ray examination of the chest, retrograde pyelography, examination of the cerebro-spinal fluid and application of the guaiac test to the stool all revealed no abnormality. On the sixth day after the patient's admission to hospital he complained of sharp precordial pain. Next day this became severe and circulatory collapse developed, with low blood pressure, distension of the veins of the neck and a paradoxical pulse. X-ray examination now showed considerable increase in the size of the heart shadow and a small area of increased density in the right costophrenic angle. Six hundred cubic centimetres of thin chocolate-coloured fluid were withdrawn from the pericardium, and dramatic improvement in the patient's condition occurred. The fluid contained many red and white blood cells, the majority of the latter being neutrophile cells. Similar large amounts of fluid were withdrawn from the pericardium on a number of subsequent occasions. The fluid became progressively thicker and its cell content less. Its colour changed from chocolate to brick red. Repeated search for bacteria, including the tubercle bacillus, by smear and cultural examination was fruitless. No parasites were seen in several wet preparations examined. On the ninth day in hospital the right pleural cavity was found to be filled with clear straw-coloured sterile fluid, which rapidly reaccumulated after removal. On the twenty-seventh day in hospital the patient had a gross hæmoptysis. He died ten days later.

The opinion held was that the cause of death was tuberculous pericarditis. Autopsy, however, revealed that the underlying infection was amœbiasis. The pericardial surfaces were yellowish-grey and granular, covered by a thick layer of necrotic material backed by granulation tissue. Similar shaggy, friable, necrotic material covered the surfaces of the right pleural cavity. The right lung contained numerous abscesses, many connecting with bronchi. In the right lobe of the liver, immediately below the diaphragm, was a large abscess filled with friable, yellowish-green material and with a firm greyish wall. No connexion could be demonstrated between the hepatic abscess, the pleural cavity or the pericardium. The necrotic tissue in the liver abscess, on the pericardium and pleura and in the lung abscesses and the walls of the liver abscess contained a great number of amœbæ, many containing red blood cells. The remainder of the liver showed extensive old scarring of irregular distribution with some regeneration of hepatic cells, suggestive of the end-result of an extensive hepatitis, presumably amœbic in origin. No evidence of any bowel lesion could be found.

Kern is quite frank in his discussion of the case. He admits that the clinical picture was dominated by the pericarditis, and that insufficient attention was paid to the history of pain in the right shoulder and abdomen and to the X-ray appearance of elevation of the diaphragm on both sides. He suggests that these should have directed attention to the possibility of an hepatic abscess, and that the material aspirated from the pericardial cavity resembled that from an amœbic abscess rather than from a tuberculous lesion. A still more important finding, to which too little attention was paid and which Kern does not discuss at all, was the considerable enlargement of the liver without tenderness. If the enlargement had been due to vascular congestion resulting from the pericarditis it is almost certain that the liver would have been tender. This clinical finding should have been sufficient to focus a curious interest below the diaphragm, particularly when it is remembered that an infective lesion spreads readily from below the diaphragm upwards, but rarely if ever does the reverse happen. It is all too easy to err when faced with a complicated illness, and just as easy to be critical in retrospect; but we shall err less often if, faced with a confusing problem, our minds are never satisfied while any one unquestioned sign or symptom remains unexplained by the diagnosis made.

[1] *Archives of Internal Medicine*, August, 1945.

Abstracts from Medical Literature.

MEDICINE.

The Treatment of Gonorrhœa with Penicillin in Oil.

M. J. ROMANSKY, R. J. MURPHY AND G. E. RITTMANN (*The Journal of the American Medical Association*, June 9, 1945) report the result of treatment by a single injection of calcium penicillin in beeswax-peanut oil of 175 male patients suffering from gonorrhœa. There were no failures among 75 patients receiving a single injection of 150,000 units, and 93 of the 100 patients who received a single injection of 100,000 units were cured. The treatment of the remaining seven patients who received 100,000 units failed, and the condition responded to a second single injection of 150,000 units. It was found that a single injection of 100,000 to 150,000 units of calcium penicillin in beeswax-peanut oil produced and maintained assayable levels of penicillin in the blood for seven and a half to ten hours with excretion of penicillin continuing in the urine for twenty-four to thirty-two hours. The penicillin in beeswax-peanut oil mixture produced no abnormal reactions locally or constitutionally.

The Treatment of Premenstrual Distress and the Androgens.

S. CHARLES FREED (*The Journal of the American Medical Association*, February 17, 1945) discusses the treatment of premenstrual distress with special consideration of the androgens. Premenstrual tension is manifested by nervousness, irritability, depression, emotional instability, headache, nausea and a feeling of tenseness. Common signs are bloating of the abdomen with subcutaneous œdema, and in addition, patients may complain of a feeling of tightness of the skin, pruritus and a swelling of the vulva, vomiting, diarrhœa and cramps. The author is of the opinion that about 40% of normal menstruating women suffer a considerable amount of distress during the premenstrual period. It has been postulated that the retention of sodium by the tissues induced by the sex steroids, associated with an increase in extracellular fluid, causes these symptoms. In this regard, ammonium chloride therapy with salt restriction during the premenstrual period has proved satisfactory, but in the author's opinion is inconvenient. He tabulates the results of treatment of sixty women afflicted with premenstrual distress who were given androgen therapy. Thirty of these received on the tenth and third days preceding the expected menses injections of testosterone propionate in amounts depending on the severity of the symptoms, the dosages being either 10 or 25 milligrammes at each injection. Many received therapy for more than one menstrual period. In the second group of thirty patients, the "oral androgen", methyl testosterone, was administered in doses of ten milligrammes daily, starting ten to seven days before the expected onset of menses. Both the parenteral and oral forms of treatment afforded satisfactory relief of the condition, and the "oral androgen", methyl testosterone, was found to be the surest and most convenient therapeutic agent.

Thiouracil Therapy in Thyreotoxicosis.

WILLIAM S. REVENS (*The Journal of the American Medical Association*, June 9, 1945) presents a report of observations on the treatment of 32 patients suffering from thyreotoxicosis with thiouracil therapy. Some of the patients had toxic diffuse goitres and others had toxic nodular goitres. Twenty of the series had received iodine therapy prior to the thiouracil and two had been given X-ray therapy in addition. Five had had surgical treatment and one patient had been operated upon twice prior to the initiation of thiouracil therapy. The average initial basal metabolic rate found in the patients was +32% in those with toxic diffuse goitres and +22% in those with the adenomatous type. All were ambulatory from the beginning of treatment, except three hospitalized patients who were soon restored to the former category. The author has discontinued the practice of the estimation of the blood cholesterol in these cases, since it has added little of value to the study. It was found that subjective improvement occurred earlier in those with diffuse goitres than in those with the adenomatous type. Weight gain was noted in all patients. An initial daily dose of thiouracil of 0·6 gramme in three doses of 0·2 gramme each appeared adequate for all ordinary purposes, and as clinical improvement set in and the basal metabolic rate fell, the dose was reduced to 0·2 gramme twice daily. When the basal metabolic rate was stabilized between +5% and −10% a maintenance dose of 0·1 to 0·3 gramme daily was sufficient to keep the patient in remission. Observations were found necessary every two weeks at first and then every four weeks. Improvement occurred on an average in three weeks in the case of those with toxic diffuse goitres, and in about nine weeks in those with toxic adenomata. Previous iodization delayed improvement in both types with a longer delay in those with toxic adenomas. A rise in the basal metabolic rate was found to occur during early thiouracil therapy in previously iodized patients because of loss of iodine effect. In this series of patients it was found that twenty-nine responded favourably, two had not been treated long enough to justify comment and one was resistant to the drug. Among five cases in which an attempt was made to stop treatment, three patients have relapsed, one is threatened with relapse and only one has remained in remission for five months. The author admits that at present it is difficult to predict when and in which cases to stop administration of the drug. Under the influence of the drug, goitres tend to increase in size and become softer during the first few weeks and more so in the diffuse toxic type than in the adenomatous toxic type; but the size of the gland decreases in all cases as therapy continues. However, in no case, in which the patient presented a palpable or visible enlargement of the gland originally, has there been a complete disappearance of the enlargement. Only one instance of drug sensitization was encountered in this series; five patients developed nausea and epigastric distress early in treatment, but this promptly disappeared after discontinuance of the drug for a few days and then resumption at a lower dosage level. Iodine fast or resistant patients can be brought to remission with thiouracil. The progress of three patients illustrates the author's statement that those with recurrent (post-surgical) hyperthyreoidism appear to be quite sensitive to thiouracil and respond promptly. Thiouracil may prove extremely useful both therapeutically and diagnostically in the mild forms of hyperthyreoidism or in the border-line cases, and in this regard it would appear preferable to adopt as the standard normal a basal metabolic rate of +5% to −20%. Signs of myxœdema developed in only one patient in the series, but this was promptly controlled by adjustment of the dosage. Auricular fibrillation with cardiac decompensation resultant upon thyreotoxicosis was promptly controlled in two cases with thiouracil. One patient with unexplained diabetes and an active toxic adenoma failed to respond to the drug. The author concludes from the data presented that thiouracil appears to be the agent of choice in inducing and maintaining a state of remission in thyreotoxicosis.

Pruritus Ani.

GUY R. MCCUTCHAN (*The American Journal of Digestive Diseases*, May, 1945) discusses *pruritus ani* and defines it as a regional type of inflammatory skin reaction, the nature of which is exceedingly complex and the ætiology of which is not accepted with any degree of general agreement. He groups the varied ætiological factors into five divisions. In the first, the physiological mechanism, it is pointed out that the sweating apparatus of the anogenital area produces an excretion containing protein and an excess of carbohydrates. This, together with a diet high in starches and sweets, furnishes an ideal culture medium for fungi and yeast organisms between two moist folds of skin. The infective mechanism, the psychogenic mechanism, mechanical factors and the allergic mechanism are other ætiological features discussed. The symptomatology and treatment are discussed, and the author states that there is no specific therapy for this symptom complex. Therapy must be individualized, and the measures for control of *pruritus ani* are divided into three categories, namely, systemic, local and miscellaneous. Diabetes is a frequent cause, and control of the hyperglycæmia may relieve the pruritus. Stippling the perineum with absolute alcohol may relieve many intractable cases.

Infectious Mononucleosis.

JOHN T. READ AND F. C. HELWIG (*Archives of Internal Medicine*, June, 1945) present a review of a series of three hundred cases of infectious mononucleosis. Special reference is made to six of these cases in which anæmia was encountered, and in three rare hæmatological features were present. The triad of anæmia, leucopenia and thrombopenia characterized these three cases, and in none of these were there any of the usual clinical manifestations of the disease, except adenopathy. In all of the cases a positive heterophile agglutination reaction was obtained. The authors suggest that the unusual hæmatological findings in three of the cases may have been due to depression

of the activity of the bone marrow resulting from an infectious granulomatous process involving the marrow. They also suggest that such a pathological process may be the underlying factor for the disturbances of the central nervous system and for the pulmonary, gastro-intestinal and hepatic manifestations which are sometimes encountered in infectious mononucleosis.

Respiratory Allergy and Unresolved Pneumonia.

JOHN A. TURNBULL (*The American Journal of Digestive Diseases*, May, 1945) discusses the relation of respiratory allergy to unresolved pneumonia and presents the clinical notes of two patients illustrative of this association. He states that vasomotor disturbances of the respiratory tract are conducive to bacterial infection, inflammation and pneumonia. Vasomotor disturbances are a factor in obstructing resolution following pneumonia, and the use of allergen-free diets may be expected to facilitate resolution in many cases in which recovery is complicated by prior existing sensitivities.

Impending Cerebral Hæmorrhage.

R. D. TAYLOR AND IRVINE H. PAGE (*The Journal of the American Medical Association*, February 17, 1945) discuss the signs and symptoms of impending cerebral hæmorrhage and analyse the records of forty patients who died of essential hypertension to determine whether or not the clinical courses of those who died of cerebral hæmorrhage were sufficiently characteristic to allow an accurate prediction of apoplexy to be made. Among the group, nineteen had fatal cerebral hæmorrhages and five signs and symptoms were consistently observed among them. They were: (*a*) severe occipital or nuchal headaches, (*b*) vertigo or syncope, (*c*) motor or sensory neurological disturbances, (*d*) nose-bleeding, and (*e*) retinal hæmorrhages in the absence of papilœdema or exudates. These findings were found to be negligible or absent among those patients who died of other causes. The authors conclude that the demonstration of any four of these five manifestations in persons with essential hypertension warrants the assumption that death from cerebral hæmorrhage will occur within 0·8 to 5·0 years (average 2·1 years).

Maternal Blood in Whooping Cough.

J. K. MOHANTY (*The Indian Medical Gazette*, April, 1945) has administered intramuscular injections of from five to fifteen millilitres of their mothers' blood daily for from three to eight days to 62 children suffering from whooping cough in the paroxysmal stage. He claims that 41 of them were cured in from four to ten days as judged by the disappearance of whoops. A slight cough and catarrh persisted, but was cleared up in the course of a fortnight. Fifteen of the children did not benefit from the treatment. In ten motherless children who received no injections and who were observed as controls, the whooping continued for from two to ten weeks. When the mother was pregnant, which happened in fourteen of the cases, the blood was thought to be much more potent, for none of the fourteen children was uncured and the cure was effected with fewer injections. The suggestion is made that some hormone, normally present in the mother's blood and present in greater amount during pregnancy, may be responsible for the curative effect in whooping cough.

The Treatment of Simmond's Disease with Male Sex Hormones.

GORDON BURKE AND MAX M. CANTER (*The Canadian Medical Association Journal*, March, 1945) discuss and assess the recent literature on the treatment of Simmond's disease. They report a case of "functional" Simmond's disease which responded well to testosterone propionate given by intramuscular injection and the concomitant use of methyl-testosterone by mouth.

The Rectal Administration of Penicillin.

L. LOEWE, E. ALTWIE-WERBER AND R. ROSENBLATT (*The Journal of the American Medical Association*, May 5, 1945) describe the results obtained by rectal administration of penicillin. Varying amounts of sodium penicillin were incorporated by hand in a cocoa butter base. Suppositories were inserted into the rectum of fourteen patients who were told to retain the suppository. There was little if any discomfort. Blood samples tested hourly for twelve hours and twenty-four hours showed effective blood levels in seven cases between four and twelve hours later, and in two cases twenty-four hours after insertion of the suppository. Blood levels of 0·012 Oxford units per millilitre were observed for up to twelve hours after doses of 0·3 million Oxford units given *per rectum*, and after one million units the level was 0·048 Oxford units per millilitre for seven hours at least. The strength 0·012 Oxford units per millilitre is said to be effective against the gonococcus, pneumococcus and hæmolytic streptococcus. The study is proceeding.

Ætiology of Peptic Ulcer.

ROBERT A. STEVEN (*American Journal of Digestive Diseases*, June, 1945) puts forward the hypothesis that peptic ulcer is due to an excess of the intrinsic factor of Castle. Pernicious anæmia represents the condition of hyposecretion of intrinsic factor and there is no disease syndrome recognized as being due to an excess of this factor. Pernicious anæmia and ulcer never occur together, and the estimation of gastric acidity shows corresponding low and high values. The secretion of intrinsic substance is probably under the control of the autonomic nervous system, as is the secretion of acid. Hence the widely held clinical belief that the incidence of ulcer is greater during emotional stress as well as the associated high acid values consistent with this theory. Experimental testing of this theory is most difficult.

The Relation of Effort to Attacks of Acute Myocardial Infarction.

HERRMAN L. BLUMGART (*The Journal of the American Medical Association*, July 14, 1945) reports a series of eleven cases in a discussion of the relation of effort to attacks of myocardial infarction. The patients, who were part of a larger series and were soldiers mostly in young adult life, all developed myocardial infarction during or shortly after strenuous exertion. The author claims that a small but definite proportion of attacks of myocardial infarction is due to preceding effort, and states that the following criteria must be satisfied to establish the relationship—the development and increase of cardiac symptoms such as pain or substernal distress during or immediately following unusual effort, continuation of the symptoms after cessation of effort, the presence of the clinical signs and symptoms of acute myocardial infarction, and development of the characteristic electrocardiographic pattern of the condition. If several days intervene between effort and development of acute myocardial infarction, the relation cannot be considered definite unless there is a continuity of symptoms bridging the interval. Several pathological mechanisms may induce acute myocardial infarction during or soon after effort. First, the occurrence of relative ischæmia brought about by the effort and resulting in a need for increased blood flow which the diseased vessels are unable to meet, may produce infarction or ventricular fibrillation. Secondly, an atheromatous plaque may rupture into the vessel. Thirdly, subintimal hæmorrhage may occur in the coronary artery. This may lead to a hæmatoma in the vessel wall which occludes the lumen. Sometimes the hæmorrhage ruptures the intima, forming a raw wound which becomes the site of a thrombus. Subintimal hæmorrhage and its sequelæ may develop gradually and serve to explain some cases in which an appreciable interval separates the strenuous activity from the final attack.

Lobectomy and Pneumonectomy for Pulmonary Tuberculosis.

R. H. OVERHOLT (replying extempore to a question at an "Information Please" session of the American College of Chest Physicians, reported in *Diseases of the Chest*, July-August, 1945) states that the indications for lobectomy or pneumonectomy in the treatment of pulmonary tuberculosis seem clear cut: (*a*) when bronchiectasis or cancer is also present; (*b*) when what has seemed to be an adequate thoracoplasty has failed; (*c*) in tuberculoma. He states that resection has been used as an alternative to thoracoplasty (*d*) in extensive multilobar but predominantly unilateral tuberculosis with endobronchial disease; (*e*) in extensive unilobar disease or giant cavitation when failure of thoracoplasty may be anticipated; (*f*) in progressive unilobar disease with symptoms suggesting bronchial disease when pneumothorax is failing.

Tropical Ulcer.

P. N. WALKER-TAYLOR (*The Lancet*, July 14, 1945) states that the time usually taken for the healing of acute tropical ulcers of the leg may be greatly reduced by "treatment according to first principles". The first step is to arrange conditions so that fresh granulations will fill the tissue gap. This is done by keeping the patient continuously recumbent with the leg raised; clean, warm, moist compresses are applied to the ulcer at first and later sterile soft paraffin. Penicillin may be applied. Once the ulcer is covered with fresh granulations and before any fibrosis can occur, "pinch grafts" of skin are applied.

Special Article.

(CONTRIBUTED BY REQUEST.)

THE SELECTION OF MEDICAL STUDENTS IN RELATION TO THE NEEDS OF A COMMUNITY AND THE FACILITIES AVAILABLE FOR INSTRUCTION.

There is a kind of character in thy life,
That to the observer doth thy history
Fully unfold.

Shakespeare, "Measure for Measure".

IT might be argued that in a democracy anyone should be able to study and qualify in medicine who had the intelligence and inclination to do so. Such a policy, however, might not only overfill the medical schools and thereby adversely affect quality of output in favour of quantity, but prove wasteful to a community by producing too many doctors. Fortunately natural adjustments take place so that in practice most universities and medical schools produce only enough doctors to meet the needs of the local communities in relation to which they stand. That such is not always the case, however, may be gauged from the fact that for a long time the medical schools in Ireland have produced more doctors than can be employed in Ireland; the result is that for many years now many medical graduates and holders of diplomas from these schools have left Ireland to practise abroad or enter the services, and it has been truly said that one of Ireland's exports is doctors.

In Sweden the problem is dealt with scientifically, and the number of doctors required to meet the medical needs of the country is decided each year. It is then determined how many students will be wanted to pursue the course in medicine, and only students up to this number are entered in the Swedish medical schools.

In most of Great Britain and the Dominions, the number of students qualifying in medicine is more or less haphazard; but there is clearly some control of the output by the number and capacity of the medical schools which have sprung up to meet local needs. The outstanding problem is how best to fill these schools, or in other words, how to utilize them to the best advantage.

Where much material is available in the shape of a preponderance of applicants for entry into the medical schools, it is highly desirable in the interest of both the community and the profession that the quality of student should be the best obtainable. Emerson has said that "the secret of education lies in respecting the pupil". We must have students whom we as teachers can respect. How can we best decide who are the best students for entry into a medical school? It will probably be agreed that achievement in the examination field should not be the sole deciding factor. Given the necessary intelligence and training, the best practitioner will be he who has the best character, character being as important an attribute for success in medical practice as it is for most things in life. Someone has truly said: "Give me the character and I will forecast the event." How then can character be assessed in prospective entrants to a medical school? Certainly neither by intelligence tests nor from marks obtained in examinations for school leaving certificates.

In the University of Wales, selection is by a small professorial board which takes into account school records and reports, examination results and the observations made at an interview with each candidate for entry. For some years now, extending back well before the Second World War, this practice has been adopted and it has been found to work very well.

Except for two or three *ex-officio* members, such as the Provost and the Principal, the members of the university teaching staff comprising the interviewing board are changed each year. Preclinical teachers as well as clinicians are included, and each year at the end of the long vacation several days are taken up in seeing candidates, who are asked questions and encouraged to talk to the members of the committee. This practice adopted by the University of Wales is not a new one, as the British Admiralty has for a long time successfully employed it in selecting candidates for entry as cadets into the Royal Navy.

The Welsh National School of Medicine, like medical schools everywhere, is not capable of indefinite expansion, and has accommodation for only a certain number of students. To endeavour to teach more than this number would not only jeopardize efficiency and the comfort of the staff, the students and the patients to whom they have access, but, it is believed, would adversely affect the product of the school. It has been decided that this must not be so affected, even if a certain number of students, usually about twice as many as can be accepted, are rejected each year. At first sight this may appear hard on the rejected candidates, because only a few of these are able to enter other medical schools; but the practice would seem to be justified, since the medical needs of the community are met by the numbers qualifying, and the quality of medical students graduating is the best that can be obtained, having been so adjudged in the first place by responsible members of the profession which they seek to practise.

It is realized, of course, that there may be other and perhaps better ways of selecting medical students; but this method, which has stood the test of time in the Royal Navy, is working well in Wales and would appear to have much to commend it. The alternative to such selection may otherwise be a haphazard scramble for examination success on the part of an unselected herd of students, too numerous to be taught properly or to have the great advantage of access to adequate teaching material, and not all possessed of that stability of character which should be the *sine qua non* of entry into the practice of a noble profession.

LAMBERT ROGERS,
Professor of Surgery, University of Wales; Director of the Surgical Unit, Welsh National School of Medicine.

British Medical Association News.

NOTICE.

THE General Secretary of the Federal Council of the British Medical Association in Australia has announced that the following medical practitioners have been released from full-time duty with His Majesty's Forces and have resumed civil practice:

Dr. H. B. Woolford, Narrabri, New South Wales (resumed December 12, 1945).
Dr. B. L. W. Clarke, Inchcolm, Wickham Terrace, Brisbane (resumed January 2, 1946).
Dr. R. H. Macdonald, 135, Macquarie Street, Sydney (resumed January 28, 1946).
Dr. F. H. Beare, 206, North Terrace, Adelaide.
Dr. R. T. Binns, 188, North Terrace, Adelaide.
Dr. R. G. de Crespigny, 260, Main North Road, Prospect, South Australia.
Dr. A. F. Hobbs, 172, North Terrace, Adelaide.
Dr. A. H. Lendon, 163, North Terrace, Adelaide.
Dr. A. D. Lamphee, 188, North Terrace, Adelaide.
Dr. L. A. Wilson, 188, North Terrace, Adelaide.
Dr. F. J. B. Miller, 178, North Terrace, Adelaide.
Dr. A. C. McEachern, 178, North Terrace, Adelaide.
Dr. N. P. Wilson, 188, North Terrace, Adelaide.
Dr. M. T. Cockburn, 170, North Terrace, Adelaide.
Dr. J. M. Dwyer, Kingswood, South Australia.
Dr. D. K. McKenzie, Kilkenny, South Australia.
Dr. M. Schneider, 175, North Terrace, Adelaide.
Dr. S. Krantz, 172, North Terrace, Adelaide.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on August 8, 1945, at the Children's Hospital, Carlton, DR. H. DOUGLAS STEPHENS, the Acting President, in the chair. Part of this report appeared in the issue of January 26, 1946.

Acute Suppurative Arthritis of the Hip.

DR. J. G. WHITAKER showed a male child, who had been admitted to the Children's Hospital at the age of two months. When he was two weeks old scattered pustules developed over his body, and a swelling appeared in the upper part of the thigh. This had been aspirated and pus obtained. X-ray examination soon afterwards revealed

the head of the femur well out of its socket and signs of osteomyelitis of the hip. Dr. Whitaker remarked that he had observed early subluxation of the head of the femur in a number of these cases. In others, sciatic nerve paralysis was evident. This was usually temporary. To counteract the subluxation, abduction of the legs at an early stage was an excellent measure, and Mr. Masson had manufactured a satisfactory splint for this purpose. Dr. Whitaker said that these cases appeared to be growing more frequent. He had encountered ten or twelve children so afflicted in the last two years. In the majority of cases the infection was present near the hip joint. The baby shown was a Mongol and had a congenital anomaly of the heart.

DR. JOHN BEGG said that in the out-patient department he had examined two or three children suffering from acute suppurative arthritis of the hip. The femoral head had become decalcified as a result of the inflammatory hyperæmia, and had disappeared, only to be reossified later. This change in the head of the femur made reduction of the dislocation a difficult matter.

DR. H. DOUGLAS STEPHENS said that he had seen quite a number of patients with Smith's arthritis, as this condition had been called. The loss of the head of the femur was indeed an awful feature of the complaint and interfered considerably with the chances of getting the head back into the socket, except in those cases in which the head had regenerated. In some cases Dr. Stephens had operated on the hip, and the head of the femur had popped out of the wound. The site of infection in such cases was probably mastitis in the mother or umbilical sepsis in the infant. Treatment became a difficult matter, especially when the child was commencing to walk. Arthrodesis seemed the only possible procedure.

Renal Calculus, Hydronephrosis and Hydroureter.

DR. JOHN BEGG showed a male child, aged six and a half years, who had suffered from pain in the right side of the back, accompanied by vomiting attacks, since the age of three years. These attacks were becoming more frequent, occurring at the rate of one a week. The attacks lasted for a couple of hours and were brought on by exercise. The appetite was "patchy". The patient had passed blood in the urine before he underwent tonsillectomy twelve months earlier, but not since then. The tonsils had been removed because they were thought to have affected his kidneys. He had not complained of dysuria. No abnormality was found on general examination. No renal tumour was palpated. Microscopic examination of the urine revealed a few red blood cells and some pus cells. X-ray examination of the renal area revealed a large calculus in the pelvis of the right kidney. Excretion pyelography revealed a right hydronephrosis and hydroureter. On May 30, 1945, through a right oblique opening in the loin, an incision was made into the renal pelvis over the stone, and the stone was removed. The wound was drained. Convalescence was complicated by an infected wound and possibly a small urinary fistula. On June 20, 1945, a cystoscopic examination was made and right ureteric catheterization was performed under general anæsthesia. The right ureteric orifice was seen to be pouting, œdematous and injected. The catheter was passed up the ureter without obstruction. X-ray examination after injection of dye revealed a right-sided hydronephrosis and hydroureter. No ureteric or vesical calculus was detected. The wound in the loin healed slowly and the child was discharged home on June 27. Dr. Begg said that he was showing the patient to determine whether it was possible to avoid further calculus formation.

DR. J. G. WHITAKER said that the only prospective surgical measure in this case was nephrectomy. This should be undertaken if there was any evidence of persistent infection, or if there was recurrence of the calculus. Otherwise a policy of *laissez-faire* should be adopted.

DR. H. DOUGLAS STEPHENS asked whether a ureteric bar existed in this case.

Dr. Begg, in reply, said that no ureteric bar was observed during cystoscopy.

Pathological Exhibits.

Bicuspid Aortic Valve.

DR. REGINALD WEBSTER showed a museum preparation of a heart which he had recently secured at autopsy on a boy, aged two and a half years. The specimen was an excellent illustration of a bicuspid condition of the aortic valve. At the time of his death the boy was receiving treatment for desquamative dermatitis of the hands and feet, and his decease was an altogether unexpected and clinically inexplicable event. At the autopsy the unduly large size of the heart attracted attention, and dissection revealed, in addition to the bicuspid aortic valve, a significant degree of patency of the *foramen ovale*. By a significant degree Dr. Webster meant that occasioned by a defect in the floor of the *fossa ovalis*; a more or less valvular communication between the atria was commonly observed, and was generally regarded as of little consequence, in view of the equality maintained in interatrial pressure. The two cusps of the aortic valve were situated anteriorly and posteriorly respectively, and the lateral half of the posterior cusp was somewhat sclerotic. Some "ballooning" of the ascending aorta was also noticeable.

In commenting upon the specimen, Dr. Webster said that the particular interest of a bicuspid aortic valve lay in its conspicuous predisposition to bacterial endocarditis. This had been established by the work of Lewis and Grant, who found a congenitally bicuspid condition of the aortic valve, carefully distinguished from an inflammatory fusion of cusps, in 26% of 31 cases of bacterial endocarditis. Among these subjects, of those in whom the aortic valve was seriously involved, 40% exhibited bicuspid valves. Lewis and Grant estimated that amongst males under the disability of a bicuspid aortic valve, at least 23% of those reaching adult life died of active endocarditis.

Dr. Webster went on to say that Grant and his collaborators had carried out interesting researches on the manner in which bacteria lodged and multiplied on cardiac valves damaged by rheumatism or affected by congenital malformations. They had shown that the small crevices, pockets and projections, which were commonly found by appropriate methods of examination, were not such as to offer a foothold to bacteria. They further observed, however, on the surfaces of some valves, minute platelet thrombi, the deposition of which appeared to be due, not to bacterial invasion, but to changes in the underlying valve. These thrombi were particularly frequent in those valves which were liable to bacterial endocarditis; they were found, for instance, in 11 of 22 mitral valves previously affected by rheumatism and in five out of ten bicuspid aortic valves. It appeared, therefore, that, apart from any active disease, the sclerosis of a valve induced by antecedent rheumatism, and the natural mechanical trauma which was presumably the *modus operandi* of the bicuspid aortic conditions, were both predisposing factors to the formation of platelet thrombi. The thrombi offered circulating bacteria a foothold and provided the nidus for the development of the septic vegetations of bacterial endocarditis.

Chloroma.

Dr. Webster detailed the autopsy findings in the case of a boy, aged four years, who had been presented as a probable subject of chloroma by Dr. J. W. Grieve at a former meeting of the society (THE MEDICAL JOURNAL OF AUSTRALIA, August 4, 1945). After reading his autopsy record, Dr. Webster said that the only comment he felt he could make was that the findings fulfilled every textbook requisite for the diagnosis of this rare condition. He had made a museum specimen of some of the green tumour tissue which he had removed from the orbital fossæ, and his technician, Mr. H. Weir, had been successful in preserving some of the green colour. Boyd stated that it was usual for the colour to fade, but mentioned that a specimen existed in the University College Hospital Museum in which the colour had been retained. Dr. Webster said that this was the only example of chloroma to have come directly under his observation.

Adrenal Hæmorrhage in Erythroblastosis.

Dr. Webster went on to discuss the occurrence of bilateral severe and indeed devastating adrenal hæmorrhage as a concomitant of *erythroblastosis fœtalis* (*icterus gravis*). The infant who provided the specimens had been admitted to the Children's Hospital, exhibiting neonatal jaundice, within twenty-four hours of birth, and laboratory findings were indicative of an extreme degree of erythroblastosis; nucleated red cells in very large numbers and in every conceivable stage of erythrogenesis were conspicuous in the blood film. The mother's obstetric history was also consistent, in that her first child had been jaundiced at birth, had remained icteric for three weeks, but had eventually recovered; the baby under discussion was the second child, and characteristically the disease had appeared in greater severity. The situation with respect to the Rh factor had also conformed to rule, the red cells of the father and baby proving Rh-positive and those of the mother Rh-negative. Father, mother and baby were all of group A in the A B O system of blood groups.

Dr. Webster reminded members that the adrenal glands were relatively large in the newborn, and when to this feature was added the almost black discoloration brought about by the hæmorrhage from which not a pin-point of glandular tissue appeared to have escaped, the effect was to produce a striking pathological specimen. Fluid blood escaped on incision of the capsule of one of the adrenals, and it was evident that the glandular tissue was totally disintegrated.

Dr. Webster said that he had noted in more than one article dealing with the Waterhouse-Friderichsen syndrome reference to the fact that adrenal hæmorrhage occasionally occurred in newborn infants. It had been attributed, he thought unconvincingly, to mechanical or traumatic factors. Another explanation which seemed more probable was that the hæmorrhage was incidental to the rapid resorption of the "fœtal cortex", the persistence of which accounted for the relatively large size of the adrenal in the newborn. In this particular instance, he was of the opinion that the adrenal apoplexy was referable directly to the congenital hæmolytic anæmia and its associated hæmorrhagic tendency; the penultimate note in the child's clinical record was of bleeding from the mouth and nose, the basis for which was disclosed by the autopsy as extensive intrapulmonary hæmorrhage.

Dr. Webster went on to say that, having introduced the subject of erythroblastosis, it would perhaps be not inappropriate if he reported two recent experiences in which the Rh situation deviated from that which usually obtained. As was well known, it was the rule to find that the mother's red blood corpuscles lacked the Rh antigen, her blood being described as "Rh-negative", whereas the Rh antigen was present in the red cells of both father and baby, whose blood was therefore described "Rh-positive". This was the position regarding the Rh factor in 90% of pregnancies, the issue of which was an erythroblastotic infant. The two cases which he proposed to mention arose from the "submerged tenth", the group of 10% in which the red cells of mother and baby were Rh-positive; indeed, the usual findings might even be reversed, the maternal red cells being Rh-positive and the fœtal cells Rh-negative.

Iso-immunization might occur in these circumstances if incompatibility in the A B O grouping existed between mother and baby, as reported in THE MEDICAL JOURNAL OF AUSTRALIA of September 2, 1944, by G. A. Kelsall, of Perth. Such an untoward development was most likely to arise when the mother's blood was of group O and that of the fœtus of group A or group B, when the anti-A or anti-B agglutinins naturally present in the mother's serum might be raised to a dangerous titre by the antigenic stimulus provided by the group A or group B blood of the fœtus. It seemed also that in these circumstances a further condition necessary for congenital hæmolytic anæmia to supervene on iso-immunization was that the fœtus should be a "non-secretor" (about one person in five was a non-secretor), and therefore devoid of a store of extracorpuscular, mobilized antigen, which would take the shock of the transplacental agglutinins, and to the extent that it did so, spare the red cells.

Dr. Webster said that although incompatibility in the A B O grouping had some interesting aspects, it was not the explanation in the two cases which he proposed to mention. In both, erythroblastosis was well attested by laboratory and autopsy findings. In one instance mother and baby were both of blood group O and the blood of both was Rh-positive, and in the other, both were of blood group A and their blood was Rh-positive. In these circumstances the suggestion was that the iso-immunization which precipitated fatal *icterus gravis* in these two infants was based on differences in Rh subtypes prevailing in the respective mothers and their babies. In the case of the first baby, evidence in support of such a view was provided by the fact that the baby's red cells were agglutinated strongly by all of these specimens of group A anti-Rh sera, whereas the mother's red cells, exposed to the action of the same three specimens of serum under identical conditions, reacted well with two, but were unaffected by the third. Thus the mother, lacking a component of the Rh complex which the baby possessed, was susceptible to iso-immunization by such an Rh radicle. In the case of the second baby, the evidence was presumptive only, for the death of the baby, before receipt of the mother's blood enabled the situation to be appreciated, precluded further investigation. Dr. Webster had determined that the red cells of the baby reacted with three specimens of anti-Rh agglutinating serum; the mother's cells were later found to be Rh-positive by the same three specimens of serum, but the early death of the baby deprived Dr. Webster of the means of making more extended tests.

In conclusion, Dr. Webster said that the subject of Rh subtypes was interesting, at the same time intricate, and promised to become more so. R. T. Simmons and G. A. Kelsall, in reporting a well-substantiated case of iso-immunization in a mother with Rh-positive blood, dependent on differing Rh subtypes in mother and baby, cited Wiener as having shown the existence of three varieties of anti-Rh agglutinins. With antiserum representative of the three agglutinins, five variants of the Rh agglutinogen had been identified. Such agglutinogens in combination gave nine to eight Rh blood types, if the Rh-negative types were included. Time did not permit of further discussion, even if he felt competent to expound such a vertiginous subject. Dr. Webster drew attention to the valuable work on blood grouping, including Rh grouping, which of recent months had emanated from the Commonwealth Serum Laboratories, at the hands of R. T. Simmons, J. J. Graydon, G. A. Kelsall and their collaborators.

Honours.

THE ORDER OF SAINT JOHN OF JERUSALEM.

HIS MAJESTY THE KING, as Sovereign Head and Patron of the Grand Priory in the British Realm of the Venerable Order of the Hospital of Saint John of Jerusalem, has approved of the following promotions and admissions in the order:

Dr. J. Newman Morris, C.M.G., of Victoria, and Colonel Wilfred Vickers, D.S.O., V.D., M.B., of New South Wales, have been promoted from Commander to be Knight in the order.

Dr. C. R. Palmer, of New South Wales, has been promoted from Serving Brother to be Officer in the order.

Dr. T. H. Chapman, Dr. S. B. Sutton, Dr. P. G. Commons and Dr. D. D. Coutts, all of Victoria, have been admitted as Serving Brothers in the order.

Correspondence.

ON THE PRICKLY HEAT.

SIR: It is proper that all attend when the navy speaks, even though, if we are to believe the navy, the subject is "trivial and inconsequential". I refer to a light discourse by Fay and Susman entitled "On the Prickly Heat", which appeared in our journal on December 22, 1945.

Respect for the senior service prompts us to take the authors' remarks seriously, even in this instance. For it is worth noting that Fay and Susman freely imply that they have given but little of their time and energy to the subject. Indeed, judging from their own words, one must wonder why they have bothered to observe and report at all.

The writer replies to Fay and Susman because he differs from them in having factual evidence which proves that *miliaria rubra* is a nocuous disease and not merely a petty "annoyance" as they would have us believe. Moreover, he differs from them in that he has given the subject long and intense study. Investigations have extended over most of three years and embrace decisive experimental and histological aspects. The total number of clinical cases seen cannot be estimated; the number of skin sections made and examined runs into thousands.

An adequate refutal of the authors' various impressions can scarcely be begun in a short space.

The present writer's work shows that, apart from its immediate symptoms, which are surely distressing even to naval sufferers, *miliaria rubra* has two notable sequelæ:

1. Prolonged blockage of the sweat glands. After miliaria, every implicated sweat gland remains obstructed by a concentric plug of keratin at the sweat pore. This obstructing plug, which is the inevitable end result of miliarial inflammation, persists for many weeks after the acute signs and symptoms of miliaria have passed.

Tropical adaptation is diminished when, and only when, a sufficient number of sweat glands has been blocked by keratin plugs. The loss of tropical adaptation is thereupon manifested by a syndrome of symptoms and signs which arises on exertion in the heat and which, because of its general nature and constant association with anidrosis, has

been called "anidrotic asthenia" by Allen and O'Brien.[1] It is perhaps unfortunate that Fay and Susman have not seen an example of this syndrome following miliaria. One probable reason, amongst others, is the severe limitation of their clinical material or, as they rather quaintly put it, their "more than nodding acquaintance with this mildest of afflictions".

It is a curious anomaly with respect to the literature of tropical acclimatization that, while the need of healthy sweat glands has long been taken for granted, the bane of obstructed glands (anidrosis) has hardly been conceded at all. However, this strange state of affairs is gradually being remedied, and, despite those who decoy and confuse, the simple truth must eventually be admitted—namely, that miliaria progressively blocks the sweat glands and that adaptation to heat is thereby progressively diminished.

The role of post-miliarial anidrosis in producing general symptoms and signs is commencing to be suspected by other observers. Reference may be made to the work of Ladell, Waterlow and Hudson[2] on what they call "heat exhaustion, type II", and to the work of Wolkin, Goodman and Kelley[3] on "thermogenic anhidrosis". In my view, the syndromes described in these papers are almost certainly identical with that which seems better described as "anidrotic asthenia". Reference can also be made to the *Bulletin of War Medicine*[4] and to the letter by Novy and Ramsey.[5] The last two correspondents are, it is interesting to note, of the navy (American).

2. Most military observers agree that miliaria plays a part in the ætiology of certain frank tropical dermatoses. The Australian Navy is indeed favoured if entirely spared such an unpleasant association.

To correct a misconception, the keratin plugs described by Allen and O'Brien are specific organic structures and were not loosely described by them as mere "epithelial debris". Moreover, it is piquant to find that Fay and Susman prescribe a rapid cure for a disease which they deny exists; they can be assured, however, that scrubbing, no matter how vigorous, fails to remove the keratin plugs, presumably because they are firmly attached and often deeply embedded.

As they admit complete ignorance of the disease, it is difficult to see what Fay and Susman achieve when they speak about a "sybaritic rest cure" of anidrotic asthenia. Despite what they suggest, I still prefer to believe that no Australian naval surgeon would send an organically ill man to duty.

Finally I quite agree with the authors' statements that their figures are "subject to the usual statistical fallacies" and that their "investigation has not achieved much".

Yours, etc.,

J. P. O'BRIEN, Major.

Undated.

References.

[1] Stuart D. Allen and J. P. O'Brien: "Tropical Anidrotic Asthenia", THE MEDICAL JOURNAL OF AUSTRALIA, September 23, 1944, page 335. T

[2] W. S. S. Ladell, J. C. Waterlow and Faulkner M. Hudson: "Desert Climate: Physiological and Clinical Observations", *The Lancet*, October 21, 1944, page 527.

[3] J. Wolkin, Joseph I. Goodman and William E. Kelley: "Failure of the Sweat Mechanism in the Desert; Thermogenic Anhidrosis", *The Journal of the American Medical Association*, February 19, 1944, page 478.

[4] *Bulletin of War Medicine*, April, 1945, page 486.

[5] Frederick G. Novy and Joseph H. Ramsey: "Failure of the Sweat Mechanism in the Desert", *The Journal of the American Medical Association*, July 8, 1944, page 738.

WAR AND HUMANISM.

SIR: As editor of the Australian medical history of the war of 1914-1918, and now engaged in work on the medical records of this one, I find myself gravely concerned as to the provision being made for the recording and study, as a problem of history, on scientific and approved lines, of that aspect of "total" warfare which I shall identify as the humanistic or ethical, or more broadly, social. Twenty-five years of hard study and thought have forced on me the conviction that, both from the standpoint of the future of mankind, and as a present and very pressing problem for the nations, and, incidentally, the Australian people, this aspect of warfare is incomparably the most important; far more so, for example, than the control of malaria, the uses of penicillin, or the comparative efficiency as killing agents of poison gas and atomic energy. And this, whether regarded objectively, as abstract philosophic research, or as an immediate and pressing national issue.

I do not propose to enter into details, for which indeed I have neither competence nor authority. My desire is, with your kind assistance, to draw attention to the need (as I believe) for expression of opinion from those sections of the community which are most directly interested, and which I shall identify as the medical profession, the Christian churches and the Australian Red Cross Society (as representing the "International Red Cross"). The evolution of international law is also involved.

Of course, each and all of these social groups may contemplate effective action, and may be collecting material for an authoritative scientific historical study of the matter. But all I can say is, that I can obtain no evidence of effective action or intention on either count. I admit that it is difficult to allot responsibility for an authoritative history, or even to identify specifically the nature and source of the material and evidence to be collected, and the line of approach which should most effectively serve the purpose in view. But I shall not accept the attitude that it is not the business of the community to move in the matter; we shall get the history that we shall show that we want.

Our medical historian has his work well and truly "cut out" to deal with the practical medical problems and history of the war. The churches contend that they are concerned with character, not with conduct. The Australian Red Cross Society holds (so far as I can interpret their attitude) that their responsibility is with policy and practice, not with principles. But I propose that none of us may, with decency or propriety, apply to ourselves the soothing unction, "it's the other fellow's job".

Yours, etc.,

A. G. BUTLER.

Canberra,
January 11, 1946.

A CASE OF INTRACTABLE CONSTIPATION.

SIR: Dr. L. Joel (THE MEDICAL JOURNAL OF AUSTRALIA, December 22, 1945) asks if his case of obstinate constipation is a record. I can vouch for a vastly greater cessation of bowel function than this. During 1924 I was a house surgeon at the North Staffordshire Infirmary, Stoke-on-Trent, England. On trips through the surrounding countryside a very fat man had often been observed stone-breaking at the side of the road. This man was later admitted to the hospital, where he told the following extraordinary story.

Now aged forty-five years, he had been born with an imperforate anus, and a left lumbar colostomy had been made three days after birth. In recent years this colostomy had stenosed, so that it remained only as a minute and intermittent sinus, and in the past twelve months on only three occasions there had been a small ooze of fæcal fluid from it.

During this time the abdomen had become progressively distended, but the patient had remained otherwise well, and it was only the burden of the large abdomen that had impelled him to seek medical advice. The colostomy was reopened and a very large quantity of mainly liquid fæces was drained from a colon which in the region of the colostomy seemed to be nearly a foot in diameter. The man made a good recovery, and left the hospital in good health.

I have often quoted this case history to students as a disproof of the theories of toxic absorption from the colon.

Yours, etc.,

ALAN E. LEE.

Brisbane Clinic,
Wickham Terrace,
Brisbane.
January 12, 1946.

SIR: On reading Dr. Joel's report of a case of intractable constipation in your issue of December 12, 1945, I looked up the notes of a case I had about fourteen years ago.

On March 10, 1932, I was called to see an old man of eighty-two suffering from chronic bronchitis. During the routine questioning I asked him when his bowels were open last, only to receive the astonishing reply: "About eighteen months ago in Chelsea." His son, who was looking after him, assured me his bowels had not been open whilst he had then been in bed, a matter of fourteen days. This was quite possible, as the old man was blind and had to be led about.

Two years later, when I was a clinical assistant at Saint Vincent's Hospital, Melbourne, during a discussion in the honoraries' room, the question of constipation came up and I quoted this case, stating that the old man had assured me that for over twenty years following an attack of colitis his bowels moved only once in twelve months on an average. Naturally the statement was received with sarcastic references and incredulity. Dr. John O'Sullivan was interested and he kindly consented to check up on the case.

On February 15, 1934, I gave the old man an ounce of barium sulphate and Dr. O'Sullivan X-rayed him at weekly intervals. Three weeks later the barium was still in the caecum, and on March 21, 1934, he passed a small ball of fæces after considerable pain lasting one hour. He averred that this was his first stool for over twelve months. His next bowel action was on August 1, 1934, and he had seven stools in two days. His bowels did not move again prior to his death on October 25, 1934. This case may be of interest to readers, and for this reason I record it.

Yours, etc.,

(Signed) D. BICKART.

167A, Booran Road,
Glenhuntly, S.E.9,
Victoria.
January 17, 1946.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 14, of January 24, 1946.

CITIZEN NAVAL FORCES OF THE COMMONWEALTH.

Royal Australian Naval Reserve.

Appointments.—John Ernest Dunlop Goldie, Archibald Gordon Murray and Peter John Falconar Grant are appointed Surgeon Lieutenants, dated 1st August, 1945, 8th September, 1945, and 2nd October, 1945, respectively; John Edward Critchley, Richard Kernan Newing and John Northwood Story are appointed Surgeon Lieutenants, dated 10th August, 1945.

AUSTRALIAN MILITARY FORCES.

Australian Army Medical Corps.

WX1522 Lieutenant-Colonel R. R. Anderson, M.C., relinquishes command of 2nd/8th Australian General Hospital and is appointed to command 105th Australian Casualty Clearing Station, 7th November, 1945.

NX139998 Lieutenant-Colonel J. L. Digby, E.D., relinquishes command of 1st Australian Orthopædic Hospital and is placed upon the Regimental Supernumerary List, 8th November, 1945.

SX4844 Colonel F. H. Beare, C.B.E., E.D., relinquishes command of 2nd/7th Australian General Hospital and is placed upon the Regimental Supernumerary List, 25th October, 1945.

NX19 Major (Temporary Lieutenant-Colonel) K. B. Armstrong is placed upon the Regimental Supernumerary List, 8th November, 1945.

NX34987 Lieutenant-Colonel J. B. McElhone is transferred to the Reserve of Officers (Australian Army Medical Corps), 27th October, 1945.

QX36744 Lieutenant-Colonel J. W. Ralston is transferred to the Reserve of Officers (Australian Army Medical Corps), 19th August, 1945 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 160 of 1945, promulgated in *Commonwealth Gazette*, No. 217A, of 1945).

To be Temporary Lieutenant-Colonels, 7th November, 1945.—Majors QX6254 R. R. Winton and NX128008 L. P. Hiatt.

To be Lieutenant-Colonel, 18th August, 1945.—QX36744 Major J. W. Ralston.

2nd/9th Australian General Hospital.—VX20305 Major A. V. Jackson is removed from the Regimental Supernumerary List, 27th October, 1945.

No. 112 (Brisbane) Military Hospital: To be Temporary Major, 24th October, 1945.—N429324 Captain I. B. Jack.

No. 113 (Concord) Military Hospital.—NX207592 Captain R. M. Rawle is transferred from Australian Army Medical Corps (Medical) Reinforcements with regimental seniority as from date of transfer, 6th September, 1945.

116th Australian General Hospital.—Captains NX207260 J. F. M. Furber and TX9443 L. H. Wilson are transferred from Australian Army Medical Corps (Medical) Reinforcements with regimental seniority as from date of transfer, 24th August, 1945.

121st Australian General Hospital (Australian Imperial Force).—SX34503 Captain J. W. Rollison is transferred from Australian Army Medical Corps (Medical) Reinforcements with regimental seniority as from date of transfer, 26th September, 1945.

10th Australian Camp Hospital.—Captains N207258 E. C. Blomfield, NX202333 C. P. V. Evans and NX207265 W. H. M. Fraser are transferred from Australian Army Medical Corps (Medical) Reinforcements with regimental seniority as from date of transfer, 19th August, 1945.

2nd/15th Australian Field Ambulance: To be Temporary Major, 26th October, 1945.—WX31093 Captain A. Breckler.

2nd/1st Australian Hospital Ship.—NX70851 Major S. S. Roseberry is removed from the Regimental Supernumerary List, 5th September, 1945.

Inter-Service Medical Wing Demobilization Centres, Australian Military Forces Component.—The following officers are transferred from Australian Army Medical Corps (Medical) Reinforcements with regimental seniority as from date of transfer, 7th September, 1945: Captains QX64243 J. A. Nye, QX64235 J. E. Trotter, QX64216 J. R. Turner, QX64239 K. J. M. Watson and QX64242 R. F. J. Wood. The following officers are transferred from Australian Army Medical Corps (Medical) Reinforcements with regimental seniority as from date of transfer, 26th September, 1945: Captains NX207584 R. J. M. Dunlop, NX207585 J. M. Ellis, NX207586 H. Gayst, NX207587 R. M. Gibson, NX207588 J. W. Graham, NX207589 H. A. J. Lister and NX207591 C. H. Thorburn.

NX183 Lieutenant-Colonel C. R. Blomfield is appointed Assistant Director-General of Medical Services "A" Branch Headquarters, Australian Military Forces, 8th November, 1945.

NX70330 Lieutenant-Colonel (Temporary Colonel) A. J. Murray, O.B.E., relinquishes command of 2nd/5th Australian General Hospital and is placed upon the Regimental Supernumerary List, 8th November, 1945.

VX39480 Lieutenant-Colonel (Temporary Colonel) E. T. T. Downie relinquishes the appointment of Assistant Director-General of Medical Services "A" Branch Land Headquarters and is placed upon the Regimental Supernumerary List, 8th November, 1945.

VX14782 Lieutenant-Colonel T. U. Ley relinquishes command of 111th Australian General Hospital and is placed upon the Regimental Supernumerary List, 7th November, 1945.

VX108488 Lieutenant-Colonel M. M. Rosefield relinquishes command of 2nd/3rd Australian Convalescent Depot and is placed upon the Regimental Supernumerary List, 14th August, 1945.

The following officers are placed upon the Regimental Supernumerary List: SX9182 Major (Temporary Lieutenant-Colonel) M. R. Gold, 18th October, 1945, Lieutenant-Colonels QX6069 H. R. Love, 7th November, 1945, VX38655 M. L. Powell and VX13621 K. W. Starr, O.B.E., 8th November, 1945.

V159801 Lieutenant-Colonel (Temporary Colonel) A. E. Colvin, C.B.E., M.C., relinquishes the rank of Temporary Colonel and is transferred to the Reserve of Officers (Australian Army Medical Corps), with the rank of Lieutenant-Colonel and is granted the rank of Honorary Colonel, 21st October, 1945.

SX9182 Major (Temporary Lieutenant-Colonel) M. R. Gold relinquishes the rank of Temporary Lieutenant-Colonel and is transferred to the Reserve of Officers (Australian Army Medical Corps) with the rank of Major and is granted the rank of Honorary Lieutenant-Colonel, 28th October, 1945.

To be Temporary Major, 12th November, 1945.—QX44129 Captain N. B. Wilmer.

2nd/2nd Australian General Hospital.—NX77277 Captain G. H. Harman is placed upon the Regimental Supernumerary List, 17th October, 1945.

2nd/8th Australian General Hospital.—VX61253 Major W. R. Gayton is placed upon the Regimental Supernumerary List, 30th October, 1945.

2nd/9th Australian General Hospital.—NX76540 Major S. D. Allen is placed upon the Regimental Supernumerary List, 19th October, 1945.

No. 105 (Adelaide) Military Hospital: To be Temporary Major, 30th October, 1945.—SX27205 Captain J. D. Fotheringham, M.C.

No. 115 (Heidelberg) Military Hospital.—VX66980 Captain E. J. McDonald is placed upon the Regimental Supernumerary List, 9th November, 1945.

104th Australian Casualty Clearing Station (Australian Imperial Force).—SX27742 Major R. N. C. Bickford is placed upon the Regimental Supernumerary List, 16th November, 1945.

19th Australian Field Ambulance (Australian Imperial Force).—QX23858 Major D. Watson is placed upon the Regimental Supernumerary List, 12th November, 1945.

Inter-Service Medical Wing Demobilization Centres, Australian Military Forces Component.—The following officers are transferred from Australian Army Medical Corps (Medical) Reinforcements with regimental seniority as from date of transfer: Captains VX97981 N. Pinkus, 30th October, 1945, VX96327 E. L. G. Beavis, 8th September, 1945, SX34384 J. S. Anderson, 17th September, 1945, NX207920 W. D. Richards, 20th September, 1945, and NX207659 J. J. G. McGirr, 27th September, 1945.

The notification respecting the transfer of NX206866 Captain R. Wilkinson which appeared in Executive Minute No. 145 of 1945, promulgated in *Commonwealth Gazette*, No. 207A, of 1945, is withdrawn.

The date of transfer of SX34113 Captain D. L. Davies which appeared in Executive Minute No. 138 of 1945, promulgated in *Commonwealth Gazette*, No. 204A, of 1945, is amended to read "25th June, 1945".

The initials of NX205420 Captain B. A. D. Curtin are as now shown and not as they appeared in Executive Minute No 145 of 1945, promulgated in *Commonwealth Gazette*, No. 207A, of 1945.

NX439 Colonel (Temporary Brigadier) W. P. MacCallum, D.S.O., M.C., from Deputy Director-General of Medical Services, Advanced Land Headquarters, is appointed Deputy Director-General of Medical Services, "A" Branch, Headquarters, Australian Military Forces, 12th November, 1945.

NX70413 Lieutenant-Colonel (Temporary Colonel) N. D. Barton, C.B.E., E.D., relinquishes command of 2nd/9th Australian General Hospital, and is appointed Acting Deputy Director-General of Medical Services, Advanced Headquarters, Australian Military Forces, 12th November, 1945.

NX139073 Lieutenant-Colonel (Temporary Colonel) J. Leah, C.B.E., relinquishes command of 2nd/1st Australian General Hospital, and is appointed to command 2nd/9th Australian General Hospital, 12th November, 1945.

NX108193 Lieutenant-Colonel C. R. Cole relinquishes command of 102nd Australian Casualty Clearing Station, and is appointed to command 101st Australian General Hospital (Australian Imperial Force), 12th November, 1945.

WX29 Lieutenant-Colonel R. R. Andrew is appointed to command 102nd Australian Casualty Clearing Station, 12th November, 1945.

NX212 Colonel (Temporary Brigadier) J. Steigrad, C.B.E., E.D., relinquishes the appointment of Deputy Director-General of Medical Services, "A" Branch, Land Headquarters, and is placed upon the Regimental Supernumerary List, 12th November, 1945.

VX39173 Colonel (Temporary Brigadier) W. A. Hailes, C.B.E., D.S.O., relinquishes the appointment of Director of Surgery, "A" Branch, Land Headquarters, and is placed upon the Regimental Supernumerary List, 15th December, 1945.

QX6247 Lieutenant-Colonel (Temporary Colonel) D. A. Cameron relinquishes the appointment of Assistant Director of Medical Services, Headquarters, 11th Australian Division (Australian Imperial Force), and is placed upon the Regimental Supernumerary List, 12th November, 1945.

NX35131 Lieutenant-Colonel (Temporary Colonel) A. W. Morrow, D.S.O., relinquishes the appointment of Consultant Physician, Advanced Land Headquarters, and is placed upon the Regimental Supernumerary List, 12th November, 1945.

NX102476 Major (Temporary Lieutenant-Colonel) J. F. N. Thomas relinquishes command of the 104th Australian General Hospital, and is placed upon the Regimental Supernumerary List, 19th November, 1945.

The following officers are placed upon the Regimental Supernumerary List: Lieutenant-Colonels NX76224 C. E. A. Cook, C.B.E., and NX34745 J. C. English, 12th November, 1945. VX38892 G. N. Morris, 21st November, 1945, and NX34858 Captain F. N. Street, M.C., 22nd November, 1945. NX157654 Captain H. Segal is removed from the Regimental Supernumerary List, 27th November, 1945. VX138724 Major (Temporary Lieutenant-Colonel) B. K. Rank relinquishes the rank of Temporary Lieutenant-Colonel, and is transferred to the Reserve of Officers (Australian Army Medical Corps), 2nd November, 1945.

Lieutenant-Colonels NX162865 F. V. Twohig and VX241 R. S. Smibert, O.B.E., are transferred to the Reserve of Officers (Australian Army Medical Corps), 15th November, 1945, and 21st November, 1945, respectively.

To be Temporary Lieutenant-Colonels.—Majors NX70628 T. M. Clouston, 12th November, 1945, and VX13622 A. D. Matheson, 19th November, 1945.

To be Temporary Major, 28th November, 1945.—VX102704 Captain T. V. Walpole.

2nd/1st Australian General Hospital.—VX108029 Captain P. J. Robinson is removed from the Regimental Supernumerary List, 22nd November, 1945.

No. 115 (Heidelberg) Military Hospital.—VX39118 Captain S. Rose is placed upon the Retired List, 16th November, 1945 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 77 of 1945, promulgated in *Commonwealth Gazette*, No. 124A, of 1945).

128th Australian General Hospital (Australian Imperial Force).—NX203798 Captain B. C. Egilitzky is placed upon the Regimental Supernumerary List, 16th November, 1945.

22nd Australian Camp Hospital.—QX62144 Captain J. C. Moffatt is removed from the Regimental Supernumerary List, 4th December, 1945.

109th Australian Casualty Clearing Station (Australian Imperial Force).—VX138744 Major G. G. Godfrey is placed upon the Regimental Supernumerary List, 23rd November, 1945.

110th Australian Casualty Clearing Station (Australian Imperial Force).—SX11115 Major J. W. Sangster is placed upon the Regimental Supernumerary List, 17th November, 1945.

VX43042 Colonel J. G. Hayden, C.B.E., E.D., relinquishes the appointment of Consulting Physician "A" Branch Land Headquarters and is placed upon the Regimental Supernumerary List, 1st November, 1945.

VX14850 Lieutenant-Colonel T. H. Ackland is placed upon the Regimental Supernumerary List, 19th November, 1945.

2nd/6th Australian General Hospital.—VX65536 Captain J. M. McCracken is removed from the Regimental Supernumerary List, 24th November, 1945.

No. 102 (Holland Park) Military Hospital.—NX108463 Major F. H. McC. Callow is placed upon the Regimental Supernumerary List, 22nd November, 1945.

No 110 (Perth) Military Hospital.—NX205348 Captain J. S. Norton is placed upon the Regimental Supernumerary List, 15th November, 1945.

118th Australian General Hospital (Australian Imperial Force).—WX3417 Captain (Temporary Major) D. L. Mercer is placed upon the Regimental Supernumerary List, 26th November, 1945. QX45117 Captain A. R. McGregor is placed upon the Regimental Supernumerary List, 11th November, 1945.

22nd Australian Camp Hospital.—QX62144 Captain J. C. Moffatt is placed upon the Regimental Supernumerary List, 15th November, 1945.

102nd Australian Casualty Clearing Station (Australian Imperial Force).—QX48388 Major F. K. S. Hirschfeld is placed upon the Regimental Supernumerary List, 23rd November, 1945.

Inter-Service Medical Wing Demobilization Centres, Australian Military Forces Component.—Captains NX208030 A. R. Burkitt, NX208031 B. W. G. Cameron, NX208032 W. J. Cathers, NX208033 A. B. Conomy and NX208034 E. J. Halliday are transferred from Australian Army Medical Corps (Medical) Reinforcements with regimental seniority as from date of transfer, 11th November, 1945.

Australian Army Medical Corps (Medical) Reinforcements.

The following officers are appointed from the Reserve of Officers (Australian Army Medical Corps), and are to be Captains: Honorary Captains NX208049 J. L. Kelly, NX208064 D. C. Cook, NX208065 G. K. V. Vanderfield, NX208066 B. E. Frecker, NX208067 B. C. Mendelsohn, NX208068 J. Cameron, NX208069 F. J. Scanlan, NX208043 W. G. Taylor and NX208059 J. G. Dickson, 28th November, 1945, and V158873 R. C. Bretherton, 29th November, 1945.

To be Captains, 1st December, 1945.—NX208062 Lothar Franz Breitner, NX208063 Eric Bruce Lee, NX208060 Edward Matthew Slattery, NX208072 William David Rimmer and NX208061 Godfrey Chesworth Scott.

Reserve of Officers.

The undermentioned officers are transferred to the Reserve of Officers with effect from the dates shown, and where applicable, cease to be seconded on the date prior to such transfer. Officers holding temporary rank relinquish such

temporary rank on the date of transfer to the Reserve of Officers:

QX48626 Major R. Grant, 10th October, 1945.

116th Australian General Hospital.—Q112464 Major W. J. Chapman, 17th October, 1945.

VX38706 Major A. O. Green, 7th October, 1945.

Retired List.

The undermentioned officer is placed upon the Retired List on the date shown:

120th Australian Special Hospital.—N100449 Captain E. E. Smithers, 10th October, 1945.

Reserve Citizen Military Forces.

Australian Army Medical Corps.

The rank of Honorary Captain E. E. Bottomley is as now shown and not as appeared in Executive Minute No. 86 of 1945, promulgated in *Commonwealth Gazette*, No. 139A, of 1945.

To be Honorary Major, 16th December, 1942.—Captain F. N. Rodda (in lieu of the notification respecting this officer which appeared in Executive Minute No. 98 of 1943, promulgated in *Commonwealth Gazette*, No. 95A, of 1943.)

Queensland Lines of Communication Area.—Lieutenant R. C. F. Cilento is transferred from the Reserve of Officers (Australian Infantry), and is to be Honorary Captain, 10th March, 1945 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 71 of 1945, promulgated in *Commonwealth Gazette*, No. 110A, of 1945).

New South Wales Lines of Communication Area: To be Honorary Captain, 21st November, 1945.—John Grant Dickson.

CASUALTIES.

ACCORDING to the casualty list received on January 24, 1946, Captain F. T. Rose, Launceston, Tasmania, is reported as having been placed on and removed from the "seriously ill" list.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Higham, Robert Harvey, M.B., B.S., 1945 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.
Doctor, Benno Basil, M.B., B.S., 1945 (Univ. Sydney), 740, New South Head Road, Rose Bay.

Books Received.

"The Clinical Application of the Rorschach Test", by Ruth Bochner, M.A., and Florence Halpern, M.A.; Second Edition; 1945. New York: Grune and Stratton, Incorporated. 8½" × 5½", pp. 345. Price: $4.00.

"The Road to High Employment: Administrative Controls in a Free Economy", by Douglas Berry Copland; 1945. Sydney, London: Angus and Robertson Limited. 8½" × 5½", pp. 100. Price: 4s. 6d.

"Economic Papers Number 5: Full Employment"; 1945. Sydney: The Economic Society of Australia and New Zealand (New South Wales Branch). 8½" × 5½", pp. 67. Price: 2s. 6d.

"Duodenal and Jejunal Peptic Ulcer: Technic of Resection", by Rudolf Nissen, M.D., with a foreword by Owen H. Wangensteen, M.D., Ph.D.; 1945. New York: Grune and Stratton; Sydney: Angus and Robertson, Limited. 8½" × 5½", pp. 143, with many illustrations. Price: 35s.

"The Electrocardiogram: Its Interpretation and Clinical Application", by Louis H. Sigler, M.D., F.A.C.P.; 1944. New York: Grune and Stratton; Sydney: Angus and Robertson, Limited. 9" × 6", pp. 419, with many illustrations. Price: 56s.

"Trauma in Internal Diseases, with Consideration of Experimental Pathology and Medicolegal Aspects", by Rudolf A. Stern, M.D.; 1945. New York: Grune and Stratton; Sydney: Angus and Robertson, Limited. 9" × 6", pp. 599. Price: 50s.

Diary for the Monty.

FEB. 5.—New South Wales Branch, B.M.A.: Organization and Science Committee.
FEB. 6.—Victorian Branch, B.M.A.: Branch Meeting.
FEB. 6.—Western Australian Branch, B.M.A.: Council Meeting.
FEB. 7.—South Australian Branch, B.M.A.: Council Meeting.
FEB. 8.—Queensland Branch, B.M.A.: Council Meeting.
FEB. 12.—Tasmanian Branch, B.M.A.: Ordinary Meeting.
FEB. 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
FEB. 19.—New South Wales Branch, B.M.A.: Medical Politics Committee.
FEB. 21.—South Australian Branch, B.M.A.: Council Meeting.
FEB. 21.—Victorian Branch, B.M.A.: Executive Meeting.
FEB. 22.—Queensland Branch, B.M.A.: Council Meeting.
FEB. 26.—New South Wales Branch, B.M.A.: Ethics Committee.
FEB. 27.—Victorian Branch, B.M.A.: Council Meeting.
FEB. 28.—South Australian Branch, B.M.A.: Scientific Meeting.
MARCH 1.—Queensland Branch, B.M.A.: Branch Meeting.
MARCH 2.—Tasmanian Branch, B.M.A.: Annual Meeting.
MARCH 5.—Federal Council, B.M.A., in Australia: Meeting at Sydney.
MARCH 5.—New South Wales Branch, B.M.A.: Organization and Science Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All Public Health Department appointments.

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